ZX COMPUTING MONTHLY

An Argus Specialist Publication June 1986 £1.50

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128 Keypad: The Program

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AMSTRAD: what next for Sinclair?

Competitions: □ Specdrum □ QL Software □ Tantalus □

REVIEWS: Quazatron □ V □ Max Headroom □ Starstrike II □


GREEN BERET
Imagine
...the name of the game
Konami®
ARCADE HOT SHOT
SPECTRUM 48K
£7·95
SPECTRUM 48K
COMMODORE 64
£8·95
AMSTRAD
Imagine Software (1984), 6 Central Street
Manchester M2 5NS. Tel: 061 834 3939. Telex: 669977
Imagine Software is available from:
WHSMITH, John Menzies, WOOLWORTH, LASKYS, Rumbelows, Greens, Spectrum Shops and all good dealers

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·B·B·B·BOUND TO BE A HIT··

"10 levels of fun make this torture excellent value for money. Nova rating. Definitely one of those 'just another go' games. Game of the month February" – Computer Gamer

"The most compulsive game I've ever played. If you don't buy it you'll never know what you've missed." says Gary Penn, Zzap! 64. Gold Medal Award. 97% overall.

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Gremlin Graphics Software Limited, Alpha House, 10 Carver Street, Sheffield S1 4FS. Tel: (0742) 753423

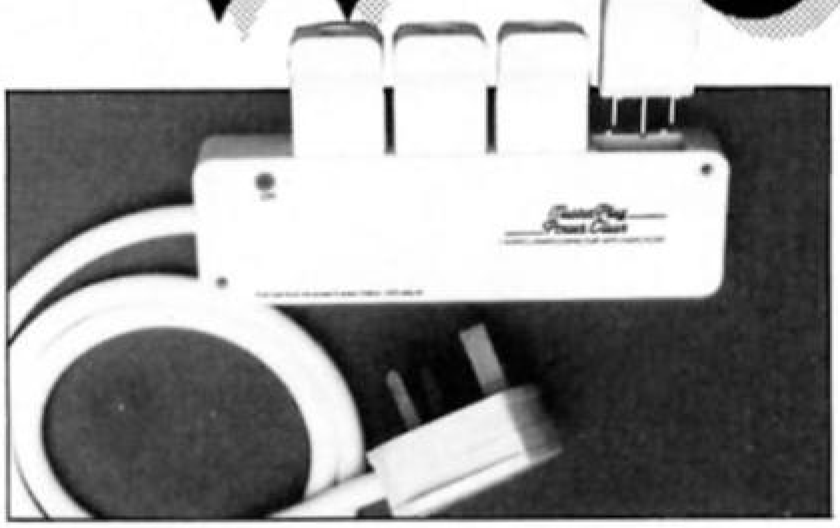
NEWS

TechniQL

While you can search high and low for a decent arcade game on the QL, graphics packages for the machine have been popping out all over the place. Talent were one of the first to produce such a utility, with their GraphiQL package, and they have now produced a complimentary program called TechiQL for use with their earlier program.

TechniQL is a C.A.D. package which allows you to produce drawings many times larger than a single screen area. It can be menu or keyboard controlled, offers 'rubber banded' options for shape drawing, and allows you to superimpose up to eight layers of drawing on top of each other or to view them separately, as well as many more features (which you can find out about from Talent on 041-552-2128), all for the price of £49.95.





Product plug

The national grid must be feeling a bit wobbly these days if the constant stream of plug-like devices intended to protect your computer from fluctuations in mains voltage is anything to go by. The latest device for controlling the 'spikes' in the mains is the Powerclean from Masterpiece Products.

This could actually come in handy as it also acts as a multi-socket adaptor allowing you to plug up to four items into it. The Powerclean costs 'less than £20' which we assume means £19.95, but you could always ring Masterpiece on 0743-860512 and prove us wrong.

Mikronox

Mikro-gen have announced the release of two new Spectrum games, Equinox and Stainless Steel. Equinox is a hunt' the radioactive waste game set on a faraway asteroid used as a dumping ground for the earth's green and glowing refuse. All the humans have understandibly legged it from the planet and you are a disposable droid who must dispose of radioactive cannisters before they turn critical and devastate the planet, you must protect the mining complex and rich seams of minerals from annihilation.

The cannisters are scattered throughout the mine but you can't change levels until you've secured level passes and to do this you have to figure out how to use a variety of tools and machines left by the miners.

If you fancy saving the earth, Stainless Steel, gives you the chance as Ricky Steel, the teenage superhero struggling to defend the world from the robot troops controlled by the immensely evil Dr Vardos. Ricky has a jet car and when in flight Mikrogen say, "you have the capability to spin and fire double barrelled anti-matter plasma bolts in 16 different directions."

Mikrogen add the "the game boasts the fastest and smoothest two directional inertia scrolling yet seen on the Spectrum."

Action reflex . . .

is the name of the next game from Mirrorsoft, once they've got Biggles out of the way.

The game has you guiding a tennis ball around four obstacle courses, each course containing 25 screens. Along the way their are crushing machines, magnets, monsters and bottomless pits all waiting for you to make a wrong bounce. Then of course there's the clock that counts down as you go around the courses and deducts points from your score all the next time.

Reflex Action will be bouncing your way for just £7.95.



Changes at Beyond

Those wacky types over at Beyond have gone and gotten themselves a new boss, Francis Lee (the not very wacky one with the glasses) and also announced their next two games to follow on from Bounces. Dante's Inferno, based on the mega-poem by Dante himself. It's produced by Denton Designs who were also responsible for Bounces, and will be followed in July by Dark Sceptre from Mike Singleton (and why isn't he hard at work on I, Of The Moon?). Both games will cost £9.95.

QL Fortran

Prospero Software, a company specialising in language software for home micros, has produced a Pro Fortran 77 package for the QL. Aimed primarily at professional computer users the package will cost £99 and is available directly from Prospero, who can be contacted on 01-741-8531.

It's for you-hoo . . .

Now that Beyond have joined Telecom they've started playing around with the phones. Doomdark's Revenge, the second in the Lords of Midnight trilogy, has been turned into an 'exciting dramatisation' that you can dial up and listen to over the phone. The Doomdark drama is playing between now and mid-June, in twelve three-minute episodes. Each episode can be heard on a separate phone number.

Episode one is on 00771-1101 and the following episodes on 00771-1102 through to 1112. Commodore and Amstrad owners will be getting the full version of the dramatisation on cassette when they buy the game, though of course the Spectrum version was out long before all this got started. However Beyond may be continuing this trend with Eye of The Moon, the final episode in the trilogy which should be completed later this year.



Flying Formula Competition Results

The response to our first competition has been overwhelming and we hope you had a lot of fun trying to rescue the boffins and crack the formula.

The first three correct answers were received from Andrew Miller, Livingston West Lothian; J. Walker Manchester and Lee Hingley from Dudley.

They will each receive a Saga 3 Elite Keyboard for their heroic performance.

From overseas the first three aces to complete were all from the Netherlands, Harrie Adema, Coevorden; Joost van Vroonhoven, Hengelo and Jos Byen, Aalten.

The trio will each receive a years free subscription to ZX Computing Monthly.

In addition, as so many readers sent in correct formulas we are also awarding ten runners up prizes of software. The first ten picked out of the hat are, Paul Cunningham, Ayrshire; M. Lawrence, Milton Keynes; Candy Hyedman, Belfast; J. Tacchi, Cochester; Ruben Fletcher, Azeitao, Portugal: B. Lewis, Dyfed; Nick Kovacs, Chesterfield; D. Lee, Staines; Nicholas Brown, Wigton and Laurence Olver, Brighton.

And just in case you are wondering we are not going to reveal the formula but we wish you luck in your future missions.

Star Printers

Star Micronics have come up with a new printer which is more suited to the products of the home micro owner than some of their other machines. The NL-10 has a near letter quality mode, single sheet and tractor feed and a special italic font. The NL-10 comes in two models, a Centronics version (£278) or RS232 (£318). If that's attracted your interest then Star can be contacted on 01-840-1800.



Joyball

The Joyball is a new kind of joystick, a sort of cross between a tracker ball and a conventional joystick, soon to be produced by Wizzard Peripherals. Originally designed for use with MSX machines the joyball has a spherical grip rather than the usual stick shaped grip. The fire buttons are set to one side on the base of the Joyball and operated with your right hand, which could make this the world's first left-handed joystick (and about time too).

The model that we've got to play with is a rewired MSX version, and the final production model isn't yet complete but perhaps we'll be able to give one a full try out in time for next issue.



SPECTRUM GAMES TOP TEN

1	Green Beret	Imagine
2	Way of the Tiger	Gremlin Graphics
3	Bombjack	Elite
4	Computer Hits 10 Vol 2	Beau Jolly
5	Crash Smashes	Gremlin Graphics
6	Twister	System 3
7	Batman	Ocean
8	Movie	Imagine
9	The Offical FA Cup Game	Virgin
10	Ping Pong	Imagine

(Chart supplied by W. H. Smiths)

Mini-Vac

Is this the ultimate in pampering your Spectrum? Surrey based company, Authenticity, have produced a miniature vacuum cleaner called Mini-Vac, intended for use with high tech equipment (which I suppose includes the Spectrum, but what about the ZX81?).

Priced at £11.95 it's intended to allow you to remove dust and dirt from those tricky little places on the machine's keyboard. Judging by the state of the ZX office machines a mini-vac could probably come in handy sometime. It should be in the shops soon, or you can contact the distributors on 01-337-3352.



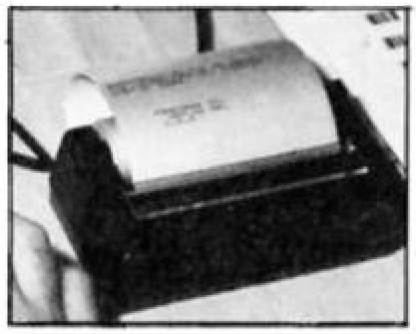
Taspro 3

Seven Stars Publishing who produced the Taspro utility for use with Tasword 2, have now come up with an upgrated version to accompany the new Tasword 3. Taspro 3 allows you to justify text with equal spaces between words, and employ alternate mode characters on the Epson FX80. Priced at just £5.95 it can be used with most well known types of printer and is available from Seven Stars right now (tel: 06284-3445).

Oooops!

In a recent news item we stated that Dean electronics were selling bundles of thermal paper for the ZX Printer at £2 for ten rolls. This should have read £20 for ten rolls, and unfortunately resulted in Dean electronics getting lots of calls from people ready to snap up this apparent mega-bargain.

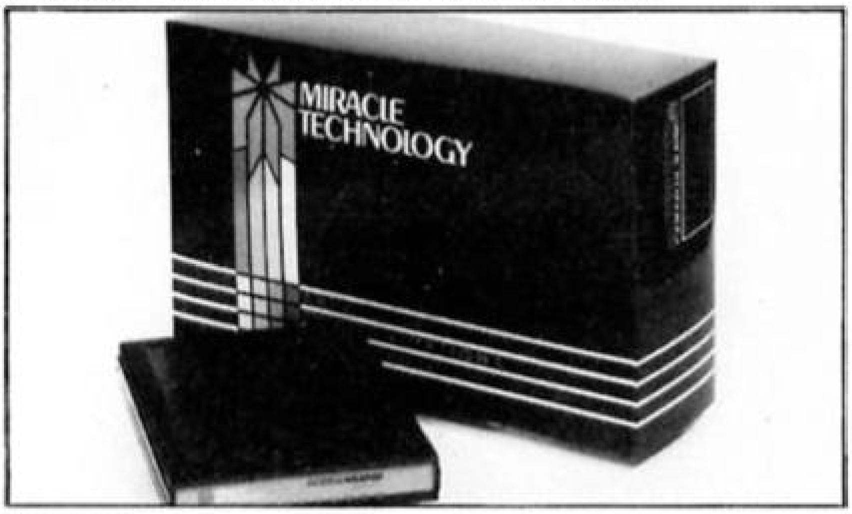
Our apologies to Dean Electronics and their switchboard operator, but at least this proves there's still a demand for the stuff. Dean can be contacted on 0344-885661 and will be happy to put the record straight.


Thermal paper: cheap at ten times the price...

Peripheral of the year

The moment you've all been waiting for, the golden envelope is opened and... the peripheral of the year is the Miracle Technology WS3000 Professional Modem. Well, well, who'd have thought it.

Miracle are proudly trumpeting the fact that the WS3000 has reached the finals of the Sunday Times Microcomputer awards for two years running. It certainly sounds like an impressive little device with just about all the features you could want in a modem, though at £295 excluding VAT it's likely to be a bit pricey for the average Sinclair owners. Miracle are on 0473-216141 if you want any further information.





Chocks away

The Biggles computer game is getting closer. Mirrorsoft have at last divulged that the game will include a three-part arcade game together with a 'strategic adventure' on the second side of the game tape.

The arcade game involves you in piloting your biplane on a mission to photograph a secret deadly weapon, a deadly chase through a cave network to find the weapon's test site, then a rooftop chase as you attempt to drop off the photos. All this is rounded off by the strategy section in which you have to finally destroy the weapon and rescue Biggles' chums who are trapped behind enemy lines. Biggles ETA is May 16, £9.95.

Valkyrie rides again!

Lots of bits and pieces are on the way from Ariolasoft, so they tell us. The only problem being that most of them are of no interest to Spectrum owners, apart from the re-release of The Ram Jam Corporation's graphic adventure, Valkyrie 17. Our adventure troll will be giving it a going over next month, but it's worth mentioning that the re-release price of the game is £7.95, and that the cassette tape carries recorded answerphone messages on one side that you'll need to get through the adventure.

Hewson's curse

The follow up to Hewson's Monster Hit rated Quazatron is to be called Pyracurse and will be available in late June. Pyracurse stars Legless O'Donnell, ace reporter for the daily Excess as he battles to save his beloved Daphne from the ancient South American god, Xipe Totec.

The latest in a long line of Hewson PR people tells us that the game will feature 'isometric 3D projection and high speed multi-directional scrolling'. Coming from Hewsons it's probably going to be worth the wait and also be worth the £9.95 asking price.

The Price of Magik

... could well be a bit of hassle I'm afraid. Level 9 have announced that starting with their next adventure release they will be adopting everyone's favourite anti-piracy device, the Lenslok. Instead of having to get past the Lenslok at the start of each game, Level 9 say that they've placed the test sequences at just one or two points in the adventure, so hopefully it won't cause as much trouble to users as it seems to have done on some other games.

In addition to the Lenslok, the Spectrum versionof Price of Magik will have a 48K version on one side, and an enhanced 128 version on the other. The 128 version will have the additional text and special 'oops' command. If at any point in the game you find yourself about to die very suddenly, you can enter the command 'Oops' and take back your last move. Apparently less polite synonyms for oops are also permitted, though I can't imagine what the ---- that's supposed to mean.


Level 9 Computing

MAD Magic

Mastertronic have two conversions from the C64 coming out on the MAD games label soon. Both are adventures namely Master of Magic and Golden Talisman. Their next £1.99 releases will be Kentilla and Zzzz a graphic, text and icon driven adventure set in the Land of Nod.



Budget Gold

US Gold are launching a new budget ranged called Americana which will feature previously unpublished American software, specially commissioned games and a smattering of Golden oldies. Games will be launched across a wide range of machines but the first release for the Spectrum is The Secret of Levitation a mystical foray into the art of hovering at will. You must go for flying guru status by accomplishing nine challenges. This mind over matter challenge is at the price of £2.99.

SINCLAIR: WHAT NEXT?

As the dust settles on Sinclair's deal with Amstrad details are emerging on the fate of the Sinclair range.

Amstrad will relaunch a revamped Sinclair in September and have retreated behind closed doors to finalise the details. Certain facts have been established however by statements made by both Amstrad and Sir Clive Sinclair.

It is now apparent that the future of the QL and Sinclair Research's next product, the Pandora, does not lie with Amstrad. Malcolm Miller, Amstrad's sales and marketing director has stated that "We don't feel Pandora is marketable in its present format."

Sinclair Research is continuing to develop the Pandora and it is on schedule to appear at the end of this year or at the beginning of 1987.

Under the agreement with Amstrad the Pandora cannot appear using the Sinclair label and Sinclair Research now have the option of finding another company to market and sell the machine or market it themselves. Sir Clive has stated, "I wouldn't rule it out that we'll be doing it ourselves."

As for the QL, Amstrad are open to offers for the remaining stock of the machines, estimated at around 20,000 — and has considered offers from a number of companies. It is not known whether the rights to manufacture the QL will be included in any deal that is made.

Alan Sugar: phasing out the Spectrum+ but a new look for the 128



The life span of the Spectrum+ would appear now to be very limited after a statement by Malcolm Miller that, "the existing stock is there to be sold off and the model phased out." Speculation now centres around the Spectrum 128 and it can be expected that Amstrad will introduce a model in September that will feature a built in tape recorder and a joystick port to confirm the machine's status as a powerful games orientated machine.

The prospect of an inbuilt joystick port will obviously affect manufacturers of joystick interfaces and Martin Shoebridge of RAM electronics told ZX, "We are now going to concentrate more on providing peripherals for the IBM and Apricot markets. As of the end of this year we are making no plans to rely on income from Spectrum products. If however the 128 continues and does well we may think again."



Sir Clive: pondering Pandora's future

Overall, the reaction of the software industry to the Amstrad deal has been favourable.

Comments

Mike Mahoney **(Alligata Software)**: "Amstrad have made a very financially astute move. They are now capable of controlling the whole market and it will be exceedingly difficult for any new company to break into the home computer market.

My feeling is that Amstrad will do a better job for Sinclair abroad and in this country. The Spectrum+ may be an old machine in this country but is still capable of selling in the worldwide market. Sir Clive has obviously decided to do away with the hassle of selling machines and just wants to get on with designing them."

Mike Meek **(Mikrogen)**: "I'm fairly confident that Amstrad are going to put a joystick port into the Spectrum 128. Why it wasn't included in the first place I will never know. So many of Sinclair's problems with returns has been due to problems with joystick interfaces not because of the machines themselves. I don't think people really appreciate just how delicate interfaces are.

I've been impressed with Amstrad's invitation to software houses to submit all their software to determine whether it actually is compatible with the 128. It's a policy they had with their own software and I think it will cause less aggravation in the future."

Howard Jacobson **(Cheetah Marketing)**: "I think it will help to stabilise the market and give confidence that the market will continue to be around in some form or other. And with Amstrad's marketing hopefully more computers will be sold. I've worked very closely with staff at Sinclair and I'm only sorry that one result has been that some people who worked very hard for the company are now out of a job."

Robert White **(Durell)**: "It's a very positive move and it looks like the Spectrum could be modified in ways that should have been done before. I think a built-in joystick port and cassette player are very good ideas, as is Amstrad's move to check the entire range of Spectrum software for compatibility with the 128."

Tony Rainbird **(Rainbird Software)**: "I think it's a good move for both parties and I'm anxious to see what happens to the Pandora. I'm confident that Sir Clive will move on and continue to innovate."

Mr Pandaal **(Kempston Micros)**: "We at Kempston view the takeover of Sinclair by Amstrad as being beneficial to the British computer industry since it introduces financial stability at a time when city institutions have a poor regard for computer orientated operations. Sadly Clive Sinclair has withdrawn from the scene but the Sinclair name will remain at the forefront of the industry. The Kempston name is synonymous with Sinclair peripherals and in that sense we will continue to support the machines and any future derivatives marketed by Amstrad."

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This is a specially designed database for storing names and addresses, and printing out in label format. Special search routines are included for selecting only names and addresses that conform to your criteria. The famous Gemini 'Searchkey' facility is included with this program, and data entry is simplified by an on screen label painting system. Just type in those names and addresses as though you were using a typewriter!

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This is a full and comprehensive cash book accounts system designed to REPLACE your manual ledger entirely. It will take you from the 'shoebox' situation of sheaves of invoices, cheque book stubs, petty cash vouchers and bank statements etc. to a properly constituted trial balance. You may then take your FINAL - ACCOUNTS package and produce profit and loss account and balance sheet ready for audit. A REAL money saver when it comes to your accountancy bill!

Final Accounts

Using the data file on microdrive or cassette prepared by the cash book program, this software will produce comprehensive end-of-year reports ready for audit by your professional adviser. The Gemini cash book and final accounts system is now in use by many thousands of businesses and as a 'classic' professional program has been translated for a wide variety of micros. Cash - book and final accounts alone warrant the purchase of this OFFICE MASTER program pack.

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THE MONSTER RATINGS

Introducing the Globs — a family of dedicated software reviewers who will be working day and night to bring you the lowdown on the latest games. Each month software is airlifted to the family seat, Globule Towers, where it is rigorously tested for entertainment value playability and value for money.



The ZX Monster Hit
The ultimate accolade, a surefire hit that's essential for your games collection.



Globella
A special game with addictive features. Miss it and miss out.



Globert
An average game with limited appeal.



Glob Minor
Snooze software — strictly for insomniacs.



Glob Senior
An exasperating game well below the accepted standard.





THE WAY OF THE TIGER

Gremlin Graphics
£9.95

"Ahh sooo" I cried as yet again I bit the dust in inglorious defeat and I must admit my thoughts were on similar lines. This martial arts fighting game comes a little late compared to the others on the market but having arrived it's a case of better late than never.

The game comes in a double cassette case and is one of the few that actually contains two cassettes, on one tape is the master program and the unarmed combat sequence and the other tape has the pole fighting and the sword fighting sections. Once you have loaded the master program you have the choice of loading in one of the sequences for practice purposes or beginning the game properly by starting with the unarmed phase and battling your way through all three phases to achieve Ninja status.

Each phase has slightly different actions to the previous one and when I say all 16 (eight without the fire button and eight with) joystick positions are used then you have a lot of training to do to achieve even reasonable control. Unlike many similar programs on the market, you can turn to face the other way and then the joystick operates logically in a mirror image of the initial controls, ie Left to move forwards becomes right to move forward. Although this sounds confusing in practice it is logical and easy to adapt to.

The major factor in a game of this type is whether the graphics are well animated and realistic and I cannot tell a lie, I thought they were the best I've seen! Added to this is the superbly designed backgrounds which feature animation and activity while you are battling it out. A nice touch was the way the people carrying the carriages put them down to applaud before continuing on their mystical way.

The difficulty level has been well considered and even on the first few attempts I managed to beat the first couple of opponents though there appear to be quite a few to each section and they get pretty good as the game progresses. Sound is kept to a minimum and the graphics and colour are first rate. I must admit to being hooked, and my only real criticism is that the first sequence was murder to load. Strangely enough the other two never gave me any trouble.

All round a great game and one to buy in preference to any other of its type, and even as well as any other you may already have!

MONSTER HIT

GAMES



SAMANTHA FOX STRIP POKER

Martech
£8.95

Martech's poker package offers two seven card stud poker games. On one side of the tape you can take on up to three opponents and on the other you can take off all your clothes in front of graphic screens featuring Samantha Fox.

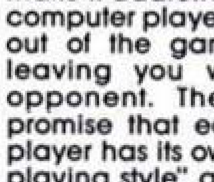
Seven Card stud poker is the variation where the first two cards and the last card are dealt face down and if you've ever seen the film The Cincinnati Kid you'll know just how rivetting this game can be. It's sad to say that even with the gimmick of Sam Fox shedding her clothes (which after all is no great revelation), the game doesn't have the excitement of the real thing.

The disappointment is in the betting system. You start with equal stakes but your betting is vetted by a computer 'referee' who will only offer a limited range of options. This prevents you not only from betting wildly which is half the fun of a gambling simulation but also blocks some apparently sensible decisions. For instance you might want to stack your cards but can't or you may want to call and are only given the chance to check or raise.

As for the titanic tussle with Sam, it seems that you are not likely to lose your shirt as her play seems to have been programmed so she loses hers as rapidly as possible. If this was all there was to the package the novelty would wear thin very quickly so wisely there is a fully clothed version of the game on side two.

The four player game, where three hands are taken by the computer offers a little more of a challenge but not enough to make it addictive as two of the computer players usually drop out of the game very early leaving you with a single opponent. The instructions promise that each computer player has its own "ability and playing style" and can adapt their 'thinking' to counter your play. After playing for a while I was still unable to decide whether the instructions were bluffing.

In its favour the game is fast enough to avoid lengthy waits between bets but the biggest drawback is the lack of a free-hand when it comes to the betting.



GRIM

BACK TO THE FUTURE

Electric Dreams
£9.95

Is there any need to mention that this is a film spin off? I thought not. An interesting idea, get your mum and dad together before you cease to exist, well it worked for Spielberg so why not for Electric Dreams?

The game display is in three sections, a centre portion which shows your actions and position in the city, those who are around you and objects available. Characters are animated and the main screen scrolls as you move. Behind you are a few doors to the Doc's house, the School, the Hall and the Snack Bar. In each of these locations are poems, tea, an alien suit and a guitar — you have to discover which is where, which takes about three minutes playing time if you are not bright enough to work it out beforehand.

Only one of these objects can be carried at a time and each object may or may not have an effect on one of the four other characters wandering about. These other bods are Doc, George, Lorraine, Biff and you, the hero, Marty.

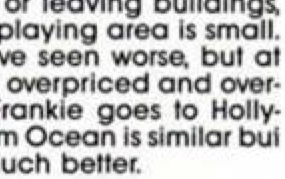
At the top of the screen is a picture of each of the four items and they change colour depending on whether they are carried or not. On the far right is a picture of a Skateboard which Marty can use to move around faster, once he has 'built' it from the two piles of crates on the main screen. Below the main display on the extreme left and right are two pictures, on the left is Marty and on the right is a family photo. These represent 'lives' and 'death' and either fade or build up depending on how well you are doing.

Between these two large pictures are the four other characters' pictures and these change colour depending on what effect Marty has produced on them with the various objects. The main object of the game is to get Lorraine and George to spend time with each other by the use of the objects and their effects on them, Biff will thump you and cause a delay though you can thump him back and put him out of action, and others will hamper you.

All this sounds very complicated but in fact is very simple. This is the biggest fault of the game, the action is fairly repetitive and I found it boring, even with the five levels which give you less time and make the characters more unpredictable. The graphics are reasonable but slow, and the scrolling main screen is jerky, characters having a disconcerting habit of disappearing, actually they are entering or leaving buildings, and the playing area is small.

Still, I've seen worse, but at £9.95 it is overpriced and over-hyped, Frankie goes to Hollywood from Ocean is similar bui much, much better.

GOOD









MAX HEADROOM

Quicksilva
£9.95

Max is a supposedly computer generated character featured in a TV show. Initially there was a futuristic adventure film which then developed into a cult music video series.

Now Max has actually become a 'real' computer character but it is not just a computer version of the joking personality with a RAM defect as seen on the TV, but a full game related to the original adventure.

The Max Module which generates the personality has been kidnapped by Network 23, the company originally responsible for creating him, and stored in the computer lab. You have to get it back from their high security building.

I loaded the game and read the accompanying instructions, these take the form of six memos and each gives hints on how to accomplish your task. I re-read them and felt I had an idea of what to do. How wrong can you be! The first part is to enter a code in the lift to get to the floor of your choice. I spent the next twenty minutes going up and down in the lift totally out of control. In between I had to run a gauntlet of vicious robots to get from one side of the room to the other side because you can only use alternative lifts.

I literally spent hours trying to solve the first problem, and it says much for the game that I never wanted to give up. I can only relate it to trying to hack into an unknown system, extremely frustrating but compelling.

The graphics were very good, the action screen being in a 3D perspective with fast, well animated characters. There is a system of icons down each side of the screen which added to the number of permutations of actions and to my confusion level.

Using the various controls is easy and playing either by joystick or keyboard is quick to master, the keys used are well selected and easy to get used to. This is not a game for the mindless 'zapper' although it seems to have a good set of fast challenging arcade screens. I forecast that a spate of helplines and hints and tips for this game will be appearing in magazines in a very short while!

A fantastically frustrating and annoyingly addictive game.

MONSTER HIT



C.O.R.E.

A'n'F
£9.95

A game of the 'wander round the caves avoiding the nasties and collecting the goodies' genre, but once all the objects have been collected you have to discover what to do with them. A game made harder for this poor reviewer, dear reader, by the lack of detailed instructions supplied in the pre-production version we received!

No matter, I girded my loins and sallied forth (not as painful as it sounds),. Seriously though, even with the lack of instructions, the game was good enough to get me to spend a lot of time trying to work out what to do.

The plot is to locate the computer memory bank which is in nine bits and hidden in a massive (thousand plus locations) asteroid. Only when this is done can you get the information you need to save mankind from the invading aliens.

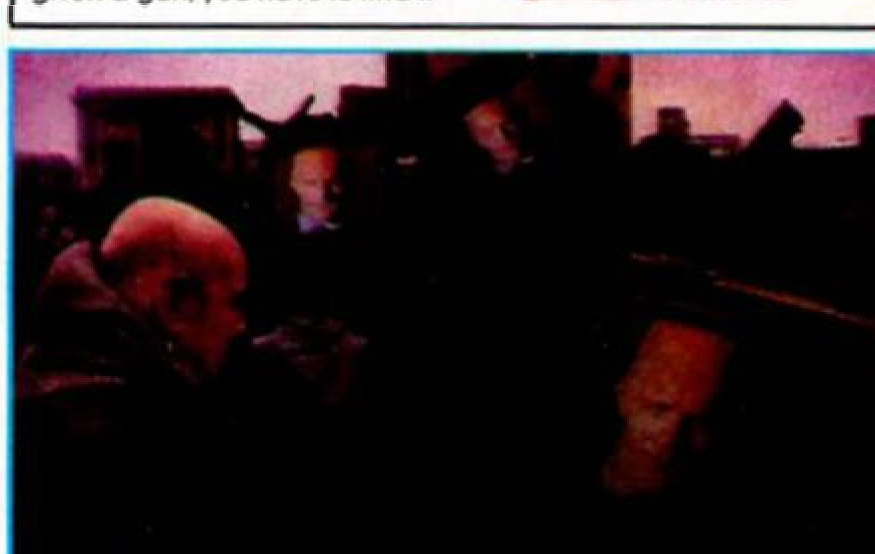
The top of the screen shows various details of time, status and position plus icon windows showing items carried, such as batteries and bits of paper. There are interesting adventure-like features such as Help, Pick Up, and Drop. Some nice touches are that you have to find objects to ensure success, you are not automatically given a gun, you have to find it and before you can save your position you've got to find a cassette.

The game has good graphics with smooth movement and superb animation, especially the stooping to pick up an object and the transporter sequences, colour is limited to a single overall colour on the animated action screen, but the objects and scenery are so well designed that no confusion was experienced.

The aliens come thick and fast and even on the few screens I managed to explore there was a very varied and evil selection to contend with. I particularly liked the lightning throwing clouds. Messages are scrolled along one line of the top of the screen, but I did find it hard at times to read the redefined character set.

This is an excellent game of its type and I must admit that I am looking forward to receiving full instructions so that I can go back to it in earnest. Probably the reviewers highest acollade, I do have a desire to go back to this one and I am sure each new challenge will be as well designed as the initial screens, the desire to see what the programmer has in store next is a major contributing feature to the addictiveness of a game of this sort.

GREAT



GAMES



INDOOR SOCCER

Magnificent 7 Software
£4.95

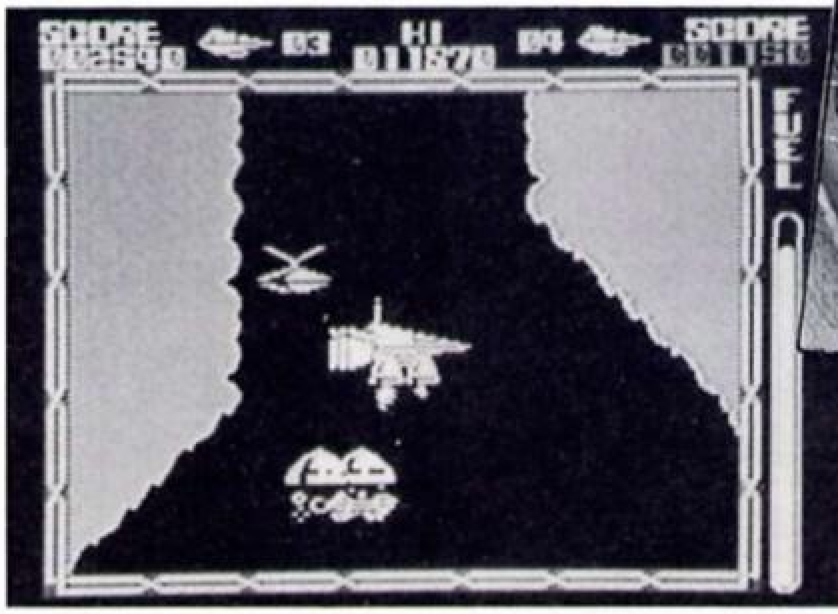
At last a game that is a true simulation of soccer with fouling, penalties and fights among the players. Sad to say that practically all the basic elements of the game except for the knobbling are crude and substandard.

Indoor soccer is sufficiently different from the eleven a side game for it to have made a really original simulation but I suspect that the only reason it was chosen was because there are less players for the programmer to cope with. Those that have managed to make it onto the pitch are afflicted with chronic flickering and colour attribute problems so that often it is impossible to see who is in possession or where the ball is. Another interesting feature is that the crowd (who look like rows of multicoloured pumkinheads) won't give the ball back if it goes out of play, which is not exactly conducive to a good game. But at least it gives you time to perfect your fouling technique which is done by running up to an opposing player and hitting the firebutton wherupon he falls on the ground and stars revolve round his head. I'm afraid I haven't yet caused sufficient injury to cause the promised punch up between players but it's not through lack of trying. It's difficult to foul opposing players when they appear to be dematerialising.

You can either hack a friend in a two-player option or take on the computer at three different levels of difficulty. When playing in two-player mode it's keyboard versus joystick which won't make for and even game.

I would like to be able to say something good about this game as I do like soccer simulations but this one just doesn't have any redeeming features and you can find soccer games already available that are far superior.





CYBERUN

Ultimate/U.S. Gold
£9.95

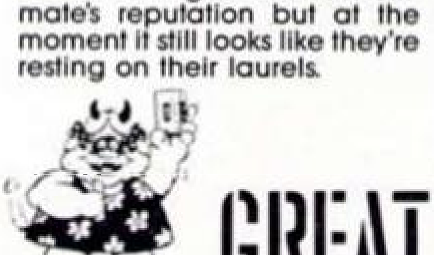
Well, have Ultimate managed a return to form after the relative disappointment of their recent releases? No, I'm affraid not. My first reaction upon loading up Cyberun was that it's a step back to the days Lunar Jetman-style shoot 'em ups, and after playing it for a while it's clear that Cyberun is a bit more sophisticated than the Jetman games but by no means as impressive or as addictive as the unsurpassed Knight Lore which was probably the game that took Ultimate's reputation to its height.

The planets of the Beta Gamma System are composed of the special element Cybertron, and bound together by a lattice of Plasmic energy. Once the Cybertron ore is remove from the lattice it runs into Cybernite, one of the most valuable substances in the known universe. But the magnetic pull of the Beta Gamma System is so strong that only the specially constructed Crystal Ship can escape with the Cybertron, and this ship is so huge that it has had to be constructed in stages and the individual sections left on the surface of the planet.

At the start of the game you are in control of the command module of the Crystal Ship, which moves fairly sluggishly over the surface of the planet. As you explore the landscape you'll find the other sections of the ship which build up to give you much greater manoeuverability and fire power, as well as extra fuel supplies to keep you going. As with Lunar Jetman, the planet seems to be populated by various enemies which take to the skies in an attempt to keep you from reaching your goal, and there is also another ship similar to your own in competition with you for the valuable Cybertron.

The graphics are large and finely detailed, but have stepped back to the standard two-dimensional style of most shoot 'em ups, though he size of the planet is quite impressive, with lots of caverns and mountains to add a bit of spice to your frantic manoeuverings. The main challenge in Cyberun seems to be coping with the enemy craft that stand in your way, and as with the jetman games there's a two-player option which indicates that just running up a high score is the main purpose of the game.

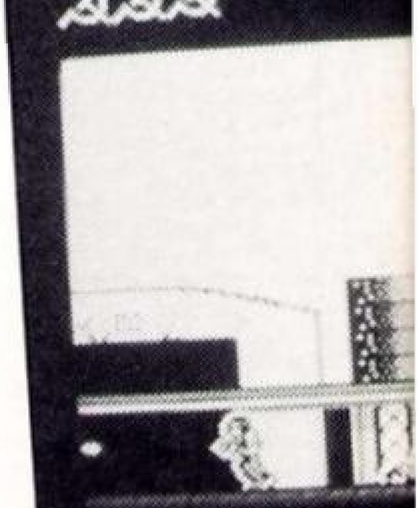
There's no doubt that Cyberun is a highly professional and slick arcade game, but with everyone expecting so much from Ultimate that's not really enough to avoid disappointment. And with the price of £9.95 Cyberun really ought to be something rather special. Oh well, maybe the long-awaited Pentagram will do something to resurrect Ultimate's reputation but at the moment it still looks like they're resting on their laurels.



GREEN BERET

Imagine
£7.95

The latest arcade conversion from Imagine is Konami's Green Beret. There's none of your subtle problem solving arcade adventure stuff here, it's sheer mayhem — death and destruction from start to finish and it'll probably sell in bundles.



Your mission as the aforementioned Green Beret is to penetrate four Strategic Defence bases and rescue the captives who are lined up in front of a firing squad. The four bases are a Harbour, Bridge, Missile Base and Prison Camp, with the captives being held in the last of these so that you have to get through all four stages of the game to succeed.

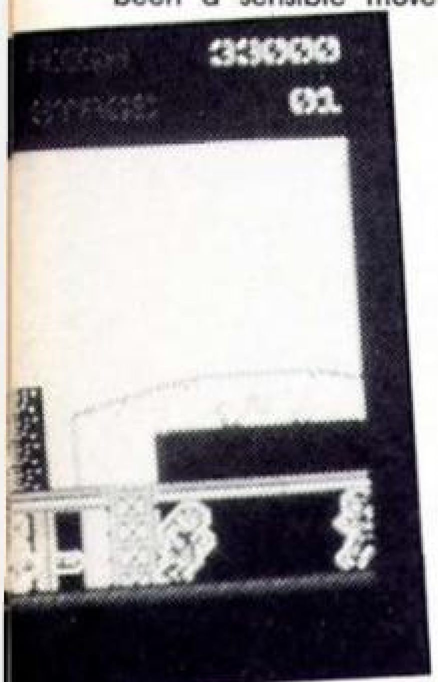
The scenery in each of these bases is different, with a series of bridges, missile launchers or whatever is appropriate for each base. The graphics are all finely drawn and smoothly animated and, apart from the limits that the Spectrum puts on the use of colour, are an almost exact reproduction of those in

the original arcade game.

But though the scenery varies in each stage, the action is the same throughout — a neverending stream of enemy soldiers who pour onto the screen from all directions, leaping, kicking, shooting and generally trying to ruin your health. But, being a 'highly trained combat machine' you too are capable of a fair bit of slaughter. Your figure can move left/right, jump forwards or backwards to avoid mines, bullets and so on, duck below leaping enemy soldiers and climb/jump onto bridges, trucks and any other useful parts of the scenery.

To begin with you are armed only with a knife, but as you skewer your way through the enemy ranks you will be able to capture some of their weapons for your own use. Flame throwers, grenades and rocket launchers are all up for grabs and these dispose of the enemy in spectacular style, with bursts of flame and disintegrating skeletons littering the screen as you go on your merry way.

On the whole, Green Beret manages to avoid any of the nationalistic chest thumping that made Rambo and Raid Over Moscow controversial, but one unfortunately tacky little detail is the use of Soviet hammer and sickle symbols to indicate the number of lives left. Changing this would have been a sensible move and



wouldn't have had any effect on the game itself as it serves absolutely no purpose in the actual gameplay.

With its single minded concentration on killing everyone in sight, Green Beret is one of those games that you'll find either completely absorbing and addictive or just too narrow in scope to hold your attention for very long. It all depends on what you like in your games, but either way Green Beret is a faithful conversion of the arcade original.



BALLBLAZER

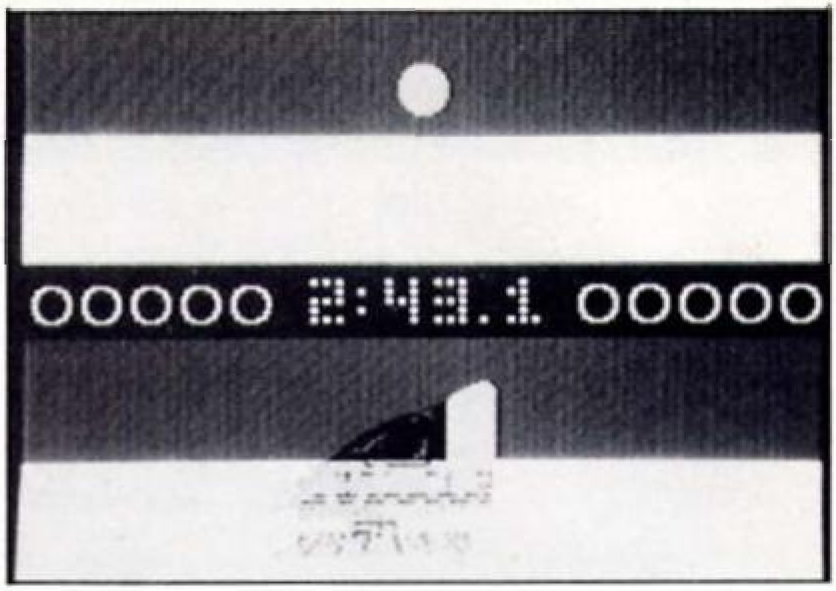
Activision
£7.99

I'd played the original Atari version of Ballblazer and, as soon as the rules were explained to me, I was hooked. I was hopeless mind, and the computer controlled droids walked all over me but I was hooked nonetheless. Now that it's available on the Spectrum Ballblazer is only marginally less fast and furious and still very addictive.

Ballblazer is the name of a futuristic sport somewhat like rugby or football, played in the 31st century by the inhabitants of many worlds. You represent the planet Terra in the finals of the Interstellar Ballblazer Championship in the year 3097.

Strapped into the seat of your rotofoil the view screen in front of you shows both your own view of the huge chessboard-like playing field and the view that your opponent has. Your view occupies the upper half of the screen, and your opponent's the lower, with a small area that shows the score separating the two views. Your rotofoil is a small one-man space craft that zooms around the field in pursuit of the Plasmorb, a small ball of energy which you can control with your rotofoil's own energy field. The purpose of the game is simply to blast the Plasmorb through your opponent's goal before he, she or it does the same to you.

It sounds fairly simple I know, but the excitement of the game comes from the speed at which



it all happens and the skill required to control both the Plasmorb and rotofoil. David Levine, creator of the original version of Ballblazer, has said that the game is a true simulation of the physics involved in such a game. This might sound a bit high-faluting but what it means is that the programmers have tried to create the same speed and sensation that you would experience if you were strapped into one of the high-speed rotofoils. The amount of maths involved in all this is a bit much for the Speccy's little Z80 chip and it can't process it all as quickly as the more powerful machine that Ballblazer was originally written on, with the result that the Spectrum version is marginally slower and the graphics not quite as smooth as on the Atari. Even so, this version is still action packed and the skill levels varied enough to challenge even the most hardened arcade addict.

It's a game that might be a bit tricky to get the hang of at first simply because it does move so quickly, and the droid opponents that the computer offers don't hang around waiting for you to work out which way is up — they just grab the ball, zoom past you and blast it into the goal while you're still spinning around dizzily. Still, there is a two (human) player option and this is the sort of game that probably works best if you play it with a friend and should liven up a few rainy afternoons.



SPORT OF KINGS

Mastertronic
£2.99

This latest release on the MAD Games label is a very high quality icon driven racing simulation. For the price it's an obvious bargain but you have to be mad about racing to fully appreciate it.

Up to five players can take part and choose up to 75 horses to race in a season. All the horses start out with no form so there's an option to auto-run some races to build up a picture of the horses' abilities.

The number of icons gives some idea of the sophistication of the program. Icons are included to give you details of the next race, your financial status, the form book on all the runners, a save to tape feature and an icon to allow you to print out the form or racing information.

The bookie icon allows you to make four kinds of bets. As you risk your shirt you are confronted by an animated picture of a dubious looking bookie puffing away on a cigar. After the race if you've had a winner the same bookie appears, this time with a frown on his face.

As for the races themselves they are the usual straight dash for the line with each horse restricted to its invisible lane. Visually there is an attention to detail that makes it a cut above most racing simulations, with each jockey's bottom bobbing up and down in realistic fashion. If you have a Currah Microspeech unit you can plug in to a commentary on the race but if you haven't you'll have to be content with lipreading the animated commentator.

If the game hooks you from the start it will exert a greater hold as time goes on because the form book builds up and should give you a greater chance of taking the bookie to the cleaners. Jockey's weights, going and form can all be included in the computer's decision on the race result so theoretically you should be able to work out the result by deduction. If only it was like that in real life.

Sport of Kings will be avidly welcomed by anyone who likes to be up to their elbows in racing statistics and form guides. It also makes for a reasonable competitive game but unless you are a racing fanatic it's appeal is not immediate. Stick with it and the fun may accumulate.





FA CUP FOOTBALL

Virgin Games
£7.95

Not so much a variation on Football Manager, more a case of team shepherding as with Virgin's officially endorsed FA Cup game, you have ten sides to guide through to the Wembley final.

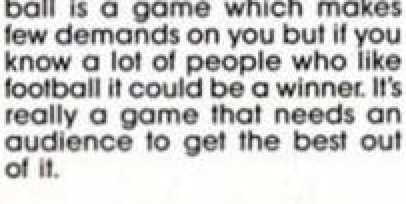
Up to eight players can choose the ten teams they want to manage from a list of 124 league and non-league sides and there's also an option to include a really obscure team of your own invention. Once you've chosen there's an option to bypass the first two rounds and start with the third when all the big teams enter. However some of your potential giant killers may have been eliminated on the way.

If you choose to play the first round, you sit through the draw and then the individual matches flash up so you can make your tactic selection. Any unchosen teams are managed by the computer. Tactic selection is rather limited; there's an option to play either an attacking, defensive or balanced side. In the later rounds there are more options, such as changing tactics at half time, and in the last three rounds there are opportunities to change strategy during the game as well as making a late substitution.

As for the games themselves it's a question of watching the scores flash up as the clock ticks away. The clock can be speeded up with the space bar if you can't stand the tension and want to know the results pronto.

If any of your squad of teams make it to the later rounds there are also managerial questions to be answered which may effect the outcome of the match and newsflashes appear sporadically on the screen to bring morale-breaking or boosting items.

But for all the attempts to convince you that you are controlling a team's fate it doesn't really come off. There is no indication of just how momentous decisions actually influence the results. So, if you are looking for a really in-depth football management game this isn't it. On the other hand it is a very enjoyable group game because the results (which often look like Rugby scores) seem to rely entirely on the computer's pre-programmed whims. FA Cup Football is a game which makes few demands on you but if you know a lot of people who like football it could be a winner. It's really a game that needs an audience to get the best out of it.



TOURNAMENT SNOOKER

Magnificent 7 Software
£4.95

Snooker has always been difficult to play and now with saturation TV coverage it's also hard to avoid. But if you can tear yourself away from the table or the TV this simulation is well worth a look.

The program begins in demo mode to assure you that those difficult pots are actually possible. Just press a key and you are into the game. There are three keys which control the cue, which rotates around the cue ball to allow a shot in any direction. Two keys give you very fine adjustment of the angle, so much so that the inlay informs you that some adjustments won't be picked up on screen but will be noted by the program.

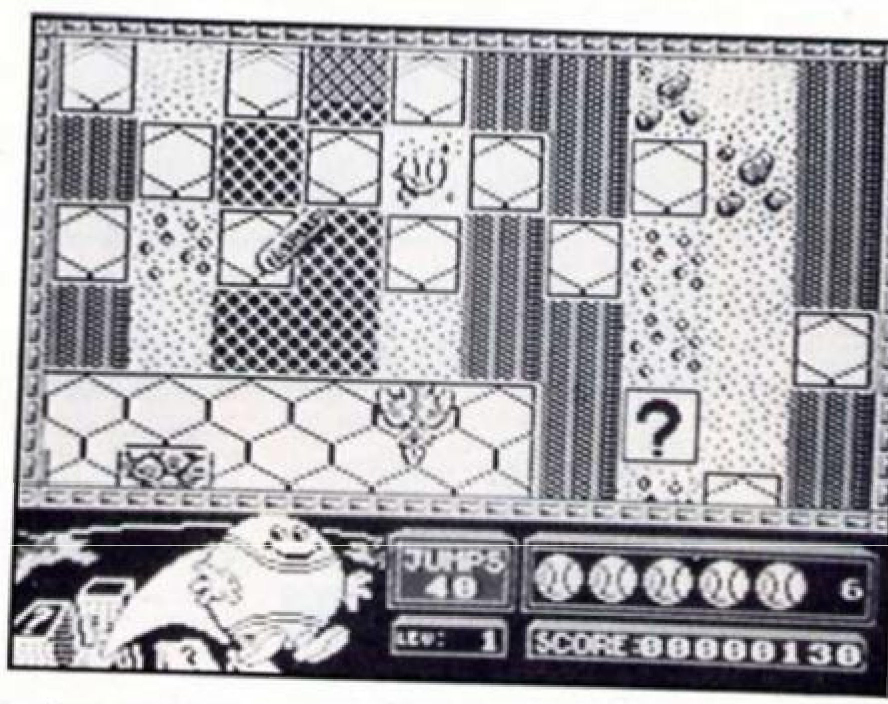
At the top of the screen is a display which gives you the players' view of the cue ball and by moving the cursor keys you can move a dot next to this ball to put top, back or side spin on the cue ball. You can vary the strength of your shot as it requires a double press of the player's key to hit the ball. The quicker the key is pressed the stronger the shot.

One problem with the game is that it is often difficult to tell which colour the balls are. Sensibly, when you nominate a colour by pressing 7 for black, 6 for pink and so on, the ball you want to pot flashes. Until you get used to the unorthodox colour scheme this feature saves you making a lot of mistakes.

Other good features include a practice mode to sharpen up your play. In this mode you can set up the table as you wish, move or remove any ball and retake a shot if you make a disastrous blunder. During play there is also an instant replay facility which gives you an immediate chance to see where you went right or to see again your brilliant pot of the cue ball.

Tournament Snooker has a save game option so you can interrupt your potential 147 break if you can take the suspense. The simulation is very smooth and realistic in action but like the real thing it is certainly no push over to become good at it. It's a difficult game to master but if you want a true simulation of snooker you wouldn't expect anything else.





BOUNDER

Gremlin Graphics
£7.95

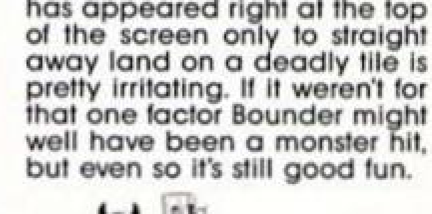
Bounder is a conversion from a game originally released on the '64, which I am told was incredibly addictive in its original version. I haven't played the '64 version so I'm not going to try and compare the two, but I can imagine that this would be a highly addictive game if only the Spectrum version were a little easier to play.

The Bounder of the title is a tennis ball which goes bouncing over a landscape made up of square tiles, each of which has different properties. Tiles with an octagonal pattern marked on them are safe to bounce on, tiles marked with an arrow give the ball a boost and allow it an extra high bounce to get over certain obstacles, and tiles marked with a question mark give you various bonusses. Just about everything else is deadly to bounce on. Some of these deadly tiles can be bounced over to reach safety, but others are parts of walls which you can't bounce over and so have to be totally avoided. There are also a few airborne obstacles, birds and what look like flying aspirins, which are deadly on contact.

You control Bounder either by joystick of keyboard ('but if you haven't got a joystick you haven't got a chance — ha!' the onscreen instructions add helpfully), and can bounce in any direction as long as your progress is forwards. Trying to bounce backwards simply slows down your forward motion a bit. The screen gives you a directly overhead view of the ball as it bounces over the landscape which scrolls downwards from the top of the screen.

At the start of the game your ball begins its bouncing at the bottom of the screen which is fine as this allows you to keep the ball low down on the screen and watch the landscape as it scrolls downwards toward you so that you can see the deadly and safe tiles as they approach. As long as you can do this the game is enjoyable and highly playable, and controlling the ball is tricky enough to keep you grasping your joystick nervously. But, as soon as you lose a life the next ball reappears near the top of the screen and you simply don't have enough time to react before the landscape scrolls down in order to try and avoid instant death.

This is one of those games that can take a very simple idea and turn it into something infuriatingly addictive. It's well designed on the whole, and the animation of the ball as it seems to bounce into and out of the screen is clear and effective. I have to admit that I've gone back to Bounder several times to try and have another go at staying alive past stage two, but the way you can lose so many lives one after the other simply because the ball has appeared right at the top of the screen only to straight away land on a deadly tile is pretty irritating. If it weren't for that one factor Bounder might well have been a monster hit, but even so it's still good fun.



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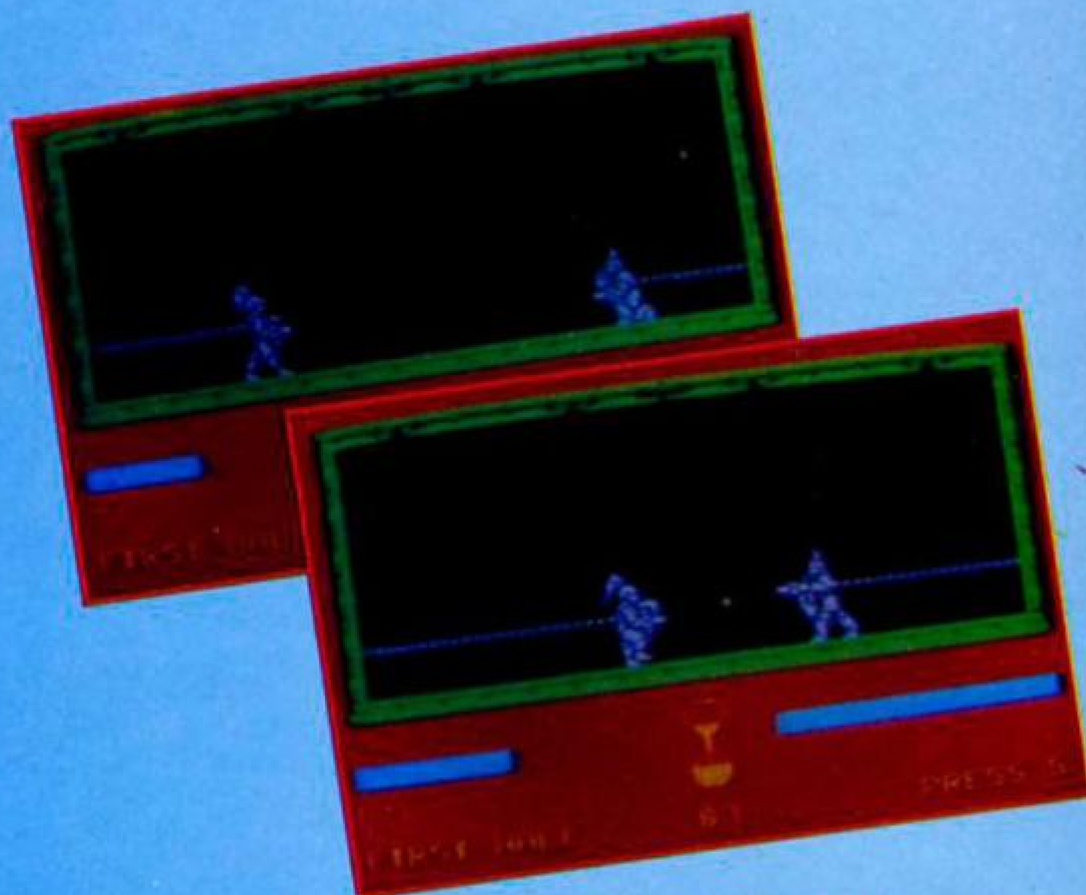
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BOUNCES

Bounces
Beyond Software
£9.95

Ashley and Eric at full stretch in a space-age ball game you won't find in the history books.



At first I couldn't figure out what I was supposed to be doing in this game at all, but after a while I began to realise that it's actually quite a subtle game in a sneaky sort of way.

Upon loading there's a demo mode which shows a court, a rectangular playing area that stretches across the width of the screen and occupies the top two thirds of it. At either end of the court are two medieval knights, named (would you believe it?) Ashley and Eric. In one player mode you control Ashley — a large and finely animated figure in full armour, topped with a plume of feathers — whilst the computer plays the surly looking Eric. There is also a two player option allowing you to play against someone else (which is probably a good idea since I haven't yet managed to beat the computer-controlled Eric even on the beginner's level).

You are both armed with short tubes, and tied to the walls at each end of the court by elastic ropes fixed around your waists. Below the court, in the lower part of the screen are an egg-timer which counts down the time left in each game, and bars which register the energy level of each player. Pressing 'S' starts the game as a small yellow ball gets thrown onto the court.

This is where I first got confused. The name Bounces led me to expect a variation on squash or handball, and at first you could think that this is what you've got here. Ashley and Eric can catch the ball in their tubes and shoot it back out again in any direction, but in fact keeping the ball in play isn't all that important. The whole point of the game is to bash your opponent and knock him over. You only score a point when your opponent falls over — the position of the ball doesn't affect the score at all unless you've actually bounced the ball off of Eric in order to send him sprawling.

Catching the ball is tricky (possibly a little too tricky) and requires a fair bit of skill and practice, but firing the ball at Eric is the best way of scoring a point off him, with the minimum risk to your own player. Though if you do try this, there's always the possibility that he may catch it and send it back to bounce off you.

Once I realised that this was the point of the game I experimented a bit and totally ignored the ball for a while. Instead, I got young Ashley to stretch his rope right across the court, walk up to Eric and shove the tube right in his face. I did score a point, but as soon as Eric got to his feet again he bounced the ball off Ashley's kneecaps and levelled the score.

I realise that this may not sound terribly subtle, but after playing the game for a while I began to realise that there are all sorts of little tricks that you can bring into play, and the addition of the elastic ropes adds an extra twist to the game. In order to move around the court you have got to constantly keep pulling against the rope which will pull you into the wall at the end of the court if you're not careful, giving a point to your opponent. The trouble is that pulling against the rope drains your energy level — the further across court you go, the faster your energy falls — so you have to very carefully judge when to stay back and wait for the ball while your energy builds up, and when to rush forward and nobble Eric.

The more I play Bounces the more enjoyable it becomes. Like squash it's a fast and basically simple game, but one which provides plenty of scope for skill and strategy, and because of that it's also likely to be one of those games that you can keep on coming back to as you learn more and more about how to play it.



GREAT

SPECTRUM GAMES REVIEW

GRIP STICK · GRIP STICK · GRIP STICK · GRIP STICK · GRIP STICK · GRIP STICK · GRIP STICK · GRIP STICK · GRIP STICK

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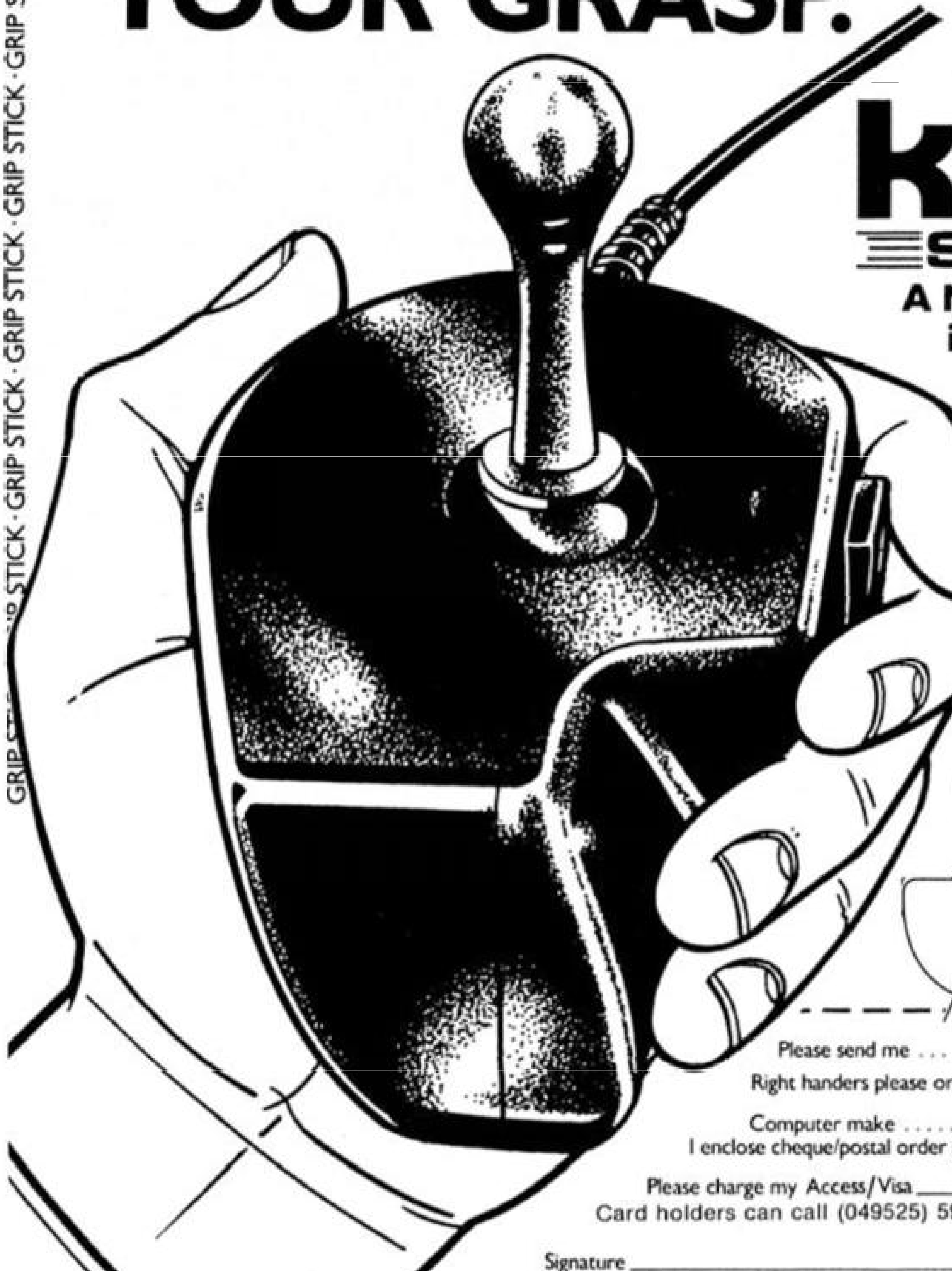
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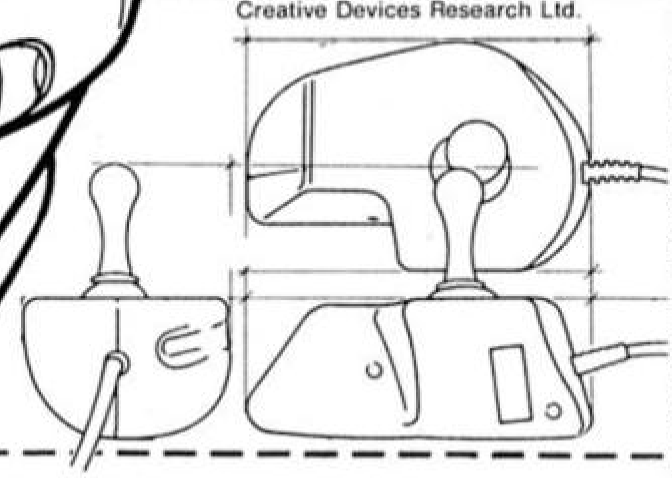
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CES SHOW

The Consumer Electronics Show, supposedly the Spring showcase for new software and hardware products delivered few surprises.

Despite a strong showing by the software houses the CES show at Olympia was dominated by the profusion of telephones and the sheer size of TV satellite receiving dishes.

It was hard to find a telephone that looked remotely like something you pick up and dial, the strategy apparently being the more disguised it is the more attractive it will be. In contrast the huge parabolic dishes that will make your garden look like Jodrell Band certainly can't be confused with anything else. But then if you are shelling out large sums in the hope of picking up live ice hockey from Russia I suppose it's best to flaunt it.

I didn't see a telephone designed to look like a satellite receiving dish but it's probably only a question of time and perhaps as the dishes become more commonplace they will get the designer treatment too and some bright spark will come up with the idea of making the dish look like a huge telephone.

New releases from the software houses and peripherals producers were thin on the ground with Cheetah unveiling most new products. On the software side, Mirrorsoft were previewing **Biggles**, Beyond were showcasing **Bounces** and Bubble Bus had a pre-production copy of an arcade adventure provisionally titied **Icicle Palace**.

Durell revealed that there is a follow up to **Saboteur II** on the way — this time with a female heroine. Should that be **Saboteuress**?

Robtek, the company who developed the Game Killer for the C64, a program that disables sprite recognition so that you can proceed through a game without loss of lives are believed to be working on a similar program for the Spectrum.

Rainbird adventure

Rainbird Software which up till now has concentrated on high quality utilities like the Art Studio has become heavily involved in the adventure market by signing marketing deals with Level 9 and Magnetic Scrolls.

Level 9 have been contracted to produce three products for Rainbird over the next year for ten different machines and Magnetic Scrolls who developed **The Pawn** for the QL are going to write six further adventures for Rainbird over the next two years.



You are at the CES Show. You have just signed a marketing agreement for future adventures...... Tony Rainbird and Anita Sinclair of Magnetic Scrolls.

The agreements were signed at the CES show and Tony Rainbird, head of Rainbird Software commented, "We are going into adventures in a big way and I think with Level 9 who are specialists in tape adventures and Magnetic Scrolls who produce mainly disc-based products "we've got a great combination. So we shall be marketing adventures across a wide range of machines from the Spectrum to the Apple."

Level 9 will continue to release adventures under their own name but their first joint project with Rainbird is a multi-load version of the **Collossal trilogy** — Colossal Adventure, Dungeon Adventure and Adventure Quest.

Pete Austin of Level 9, said, "We believe this agreement marks a step forward in adventure games. We expect a substantial increase in adventure playing and Rainbird are prepared to support our products in a unique way."

Anita Sinclair, managing director of Magnetic Scrolls, saw the deal as an opportunity to develope further the parser (text input system) that broke new boundaries with the Pawn.

"This agreement with Rainbird enables us to continue our research into natural language and other artificial intelligence related projects and to produce adventures of the highest quality."

Into the Valley of Nidd

Another new marketing agreement was announced at the show between Nidd Valley Products, developers of the Slomo speed controller and Domark.

From now on Nidd Valley's products will be marketed as the Periware range by Domark. Unfortunately the Digimouse and Anamouse scheduled to be launched at the show have been delayed but we hope to bring you a full review in the next issue.

Gold plated

A new label to appear on the peripherals scene is Powerplay who are marketing two joystick interfaces complete with gold plating on the connections. Not a luxury at all says Ash Taylor, Powerplay's managing director, "gold plating ensures good connections and in the past many problems with interfaces have been caused because connections are poor."

Compatible with both 48 and 128K Spectrums the single port interface will retail at £9.95 and the dual port at £12.95.

The Sound of Cheetah

Cheetah Marketing chose the CES Show to unveil a number of peripherals and music add-ons for the Spectrum. For the music fanatic Cheetah have followed up the success of the Specdrum with a Midi Interface and a Sound Sampler.

The Midi Interface for 48K and 128K Spectrums will control any midi-compatible instrument. A storage facility means that 1000's of notes can be filed for future reference. Other features include real or step time input from either the instrument or computer, a midi delay facility and forward and reverse sequence playback. The Midi Interface will retail for £49.95. There is also a 128 to Midi Interface lead available which will connect the 128 Spectrum with MIDI compatible instruments, and will cost £9.75.



Players

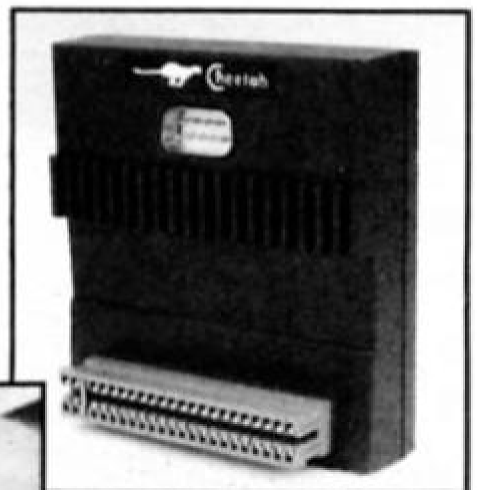
Enter a new budget label. Players is an offshoot of Interceptor Software and is releasing games for a wide variety of machines at the fashionable price of £1.99.

Players have gone for a distinctive geometric abstract look for their packaging and are obviously concerned with putting across a new image for the impulse buyer. If they pay as much attention to the quality of software as they have done in devising the visuals, Players may be a label to look out for.

As for the games themselves, Players have six releases projected for the Spectrum, **Shrewsbury Key, Cagara, Desert Hawk, Claws of Despair, Zacaron Mystery** and **Journey to the Centre of Eddie Smith's Head**. (Now there's a catchy title).



The s-s-s- Sound Sampler



The new joystick interface



Midi Interface

With the sound sampler you can transform any sound to create a huge range of effects. Sampled sounds can be replayed at various pitches forward and backwards and there's also a sync facilitys. Sound can be edited, mixed with other samples and echo reverb etc can be added. There are sample sound effects included but the real pleasure is concocting your own sound effects. The add-on comes complete with an instruction manual, software and a microphone for £44.95. If you've ever wanted to emulate Paul Hardcastle of n-n-n-19 fame or make your voice sound like Donald Duck this package has the answer.

And, if you find that using one peripheral at a time is too constricting, Cheetah have introduced a Split 56 Way Extension Connector enabling two Spectrum peripherals to be linked to the computer bus. The connector retails at £10.99.

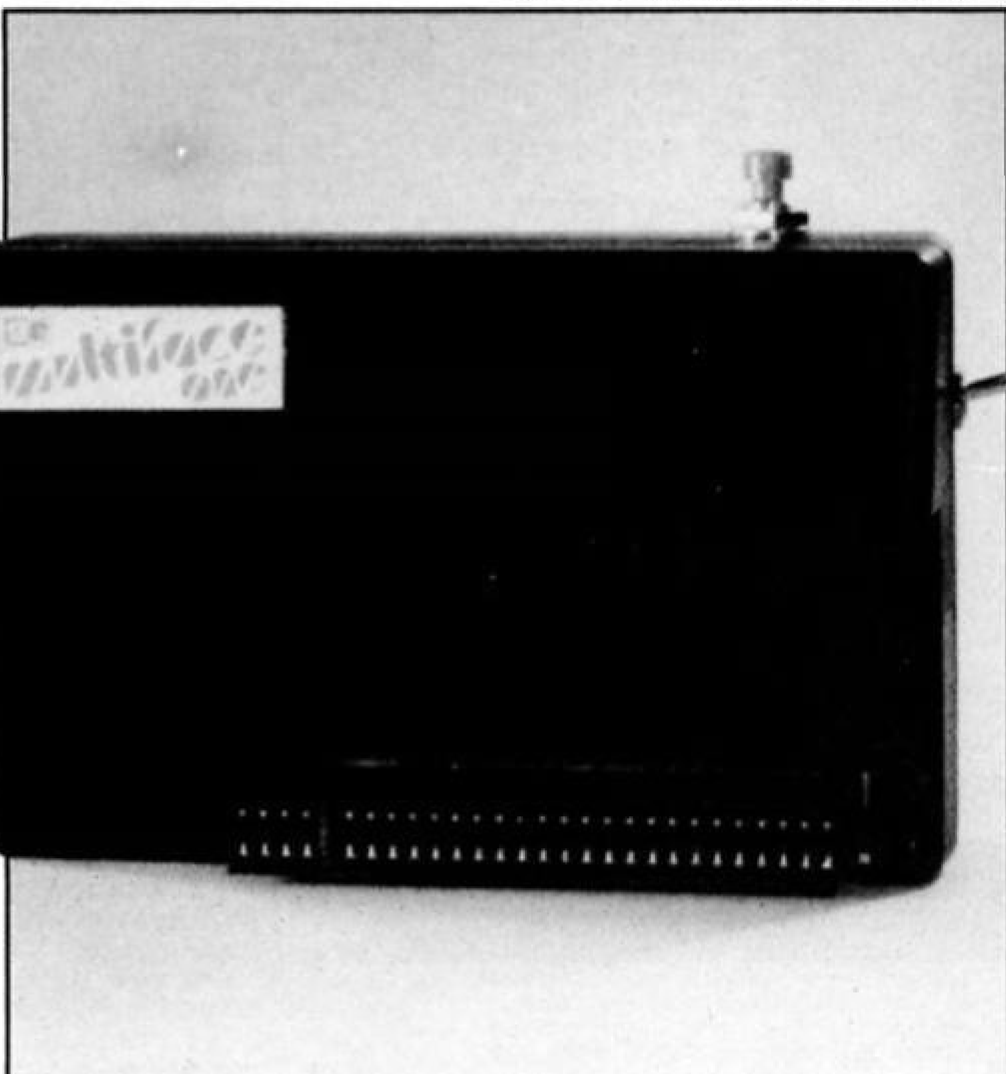
Cheetah also launched a new-look joystick interface compatible with all Spectrums and accepting Atari style joysticks. The single port interface costs £9.75.

Getting your back up

Multiface One
Romantic Robot
£39.95

A number of backup interfaces work on the principle of saving a "snapshot" of RAM when you press the button. Romantic Robot's Multiface One, one of the newest, is simple to use, for the software is on EPROM (no wearisom cassette-loading). It will save directly to microdrive, to newer versions of Betadisc (with an easy, documented hardware modification), to Opus Discovery, to tape, to Wafadrive or to Kempston disc, although in this case the software is optional instead of that for Betadisc. Saved programs run in the absence of the interface.

Apart from the red button, the interface consists of the usual upright black box (neat, strong) has a through port, an on-off switch to avoid interference with peripherals and a Kempston joystick port.



The EPROM contains several useful toolkit commands, a COPY command (but only for a limited range of interfaces) and the facility to page in the additional RAM for a variety of purposes. All are well-documented, with examples where necessary.

I converted "The Flying Formula" to my Discovery. Multiface must fit between Spectrum and Discovery; users with Spectrum and Discovery firmly connected will have to take them apart (messy). My battered Dk'Tronics keyboard needed a ribbon cable to join it to Discovery; just as well, as Multiface One would not fit it. Next to the Discovery, it fouled the disc slot of drive 2 almost completely, and drive 1 is accessed only with difficulty. I have an early disc drive and I see why the Multiface instructions recommend the later (taller) unit.

However, this was the only real problem I had. I took only five minutes to convert from tape to disc (including loading time); the instructions (printed on thin shiny card) were easy to follow, and the on-screen prompts made it a doddle. All I had to do was load the game, then when the title screen changed to the joystick menu I pressed the red button and followed the prompts.

I have a 5.25" unit as drive 2 which I keep games on. Converting the basic loader took a long time as this is just one huge and most peculiar statement; they must have got it in by devious means! When you try and EDIT, you end up with *two* cursors. Cursor movement is snail-like and accompanied by the interesting buzz mentioned in chapter 24 of the old manual; you have to delete the first line or so before you can EDIT the hidden lines, and then re-insert the important bits afterwards. In contrast, the code on disc 1, saved in three sections, transferred easily with the MOVE command.

Whilst Multiface One will work with the 128K Spectrum, it will do so only in 48K mode. Nevertheless, it has several advantages over comparable interfaces. It is compatible with a large number of devices to which it will load immediately, instead of having to load to tape and then fiddle with a header-reader before saving to disc. It is quick (other devices can take an hour or more). And, best of all, even I found it simple to use. With the additional features (port, switch, toolkit and accessible RAM) it cannot but represent good value at £39.95 and I therefore recommend it.

John Wase.

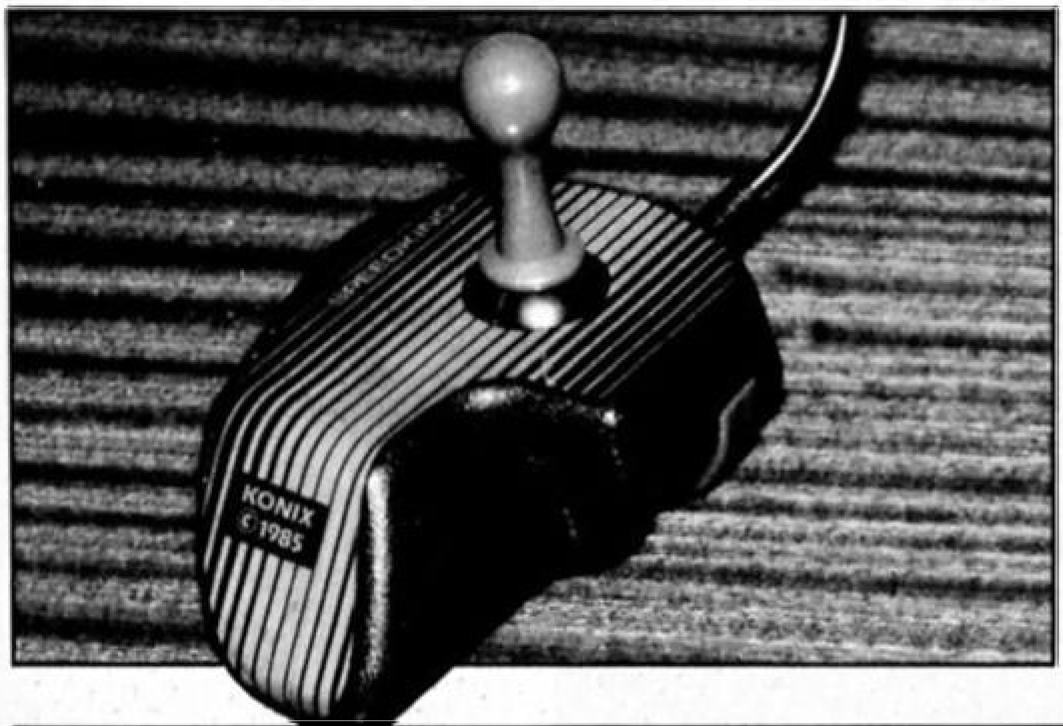
John apologises for the delay in answering some readers' Discovery queries but was in hospital when the article was published and is now trying to catch up with the backlog — rest assured, your letter will be answered very soon.

Gripping stuff

Speedking Gripstick
Konyx
£12.99

The Speedking from Konyx Computer Products is called a 'gripstick' rather than a joystick because of the shape of the hand unit. This is shaped in such a way that it fits comfortably into the palm of your left hand, and as your hand curls around the unit your index finger (the one next to your thumb) naturally comes to rest over the fire button.

The conventional joystick part of the unit, the stick controlling direction and movement, is quite small and projects upwards from the face of the joystick as if it were growing out of the palm of your hand. It does look a bit odd, and not at all streamlined, but it fits the hand quite comfortably unlike the large bases on some more conventional models and the directional control stick, though small, is nice and solid and handles well.



Of course the real test of any joystick is how it handles a good shoot 'em up. So, I loaded in Cyberun and Flying Formula and managed to run up higher scores than I usually do, then I tried it out on Sai Combat which, being a kung fu game required more than just fast blasting skills. On all counts the Speedking performed really well.

It works so well because the hand-shaped grip allows you to hold it comfortably and concentrate on the game rather than on trying to stop the joystick from flying out of your hand. The position of the fire button is also well thought out and isn't likely to induce cramp after a few bursts of fire. My only criticism of the Speedking is that it's probably useless if you're left-handed, since it will only fit into the left hand and can only be controlled with the right. However for the right-handed majority it's well worth the price and I personally would rather use the Speedking than just about any other joystick that I've yet come across.

Changing tunes

Specdrum Latin Kit
Cheetah
£3.99

This isn't actually a piece of hardware, but as it's a software add-on to Cheetah's Specdrum it seemed appropriate to mention it on these pages.

The Latin Kit, which also includes a kit editor on the reverse side of the tape, allows you to program eight new 'voices' into the Specdrum. As the name suggests they are all latin rhythm instruments, with names like Cabasa, Hi and Lo Timbale, Cowbells and so on. Using these new voices is quite simple: you just load the Specdrum software as usual, then when the 'Kit Loading' message appears on screen you remove the Specdrum tape and replace it with the Latin Kit tape. In no time at all you'll be samba-ing around the kitchen with a bowl of fruit on your head.

The Kit Editor on the reverse side of the tape is a utility which allows you to compile your own kits of drum sounds. The Latin Kit and the kit which comes in the Specdrum software have got complete kits of eight instruments which have to be loaded into the Specdrum all at once. The Kit Editor allows you to pick individual instrument sounds and mix them up to produce your own combinations of sounds, so you could, if you wanted, mix some of the latin instruments with the instruments already supplied, or pick out individual instruments from any further kits that Cheetah may produce.

The editor also gives you the ability to play any sound in reverse and save this onto tape so that you can create new sounds out of the ones already provided (actually, a cowbell played backwards sounds a bit odd and I'm not sure what you'd want to do with it, but I'm sure that there are some avant-garde musicians out there who would be over the moon to have a backwards cowbell).

The Specdrum has already had rave reviews in every magazine in the country, and if you've got one then for just £3.99 the Latin Kit and Editor is a cheap and useful addition to your 'kit'.

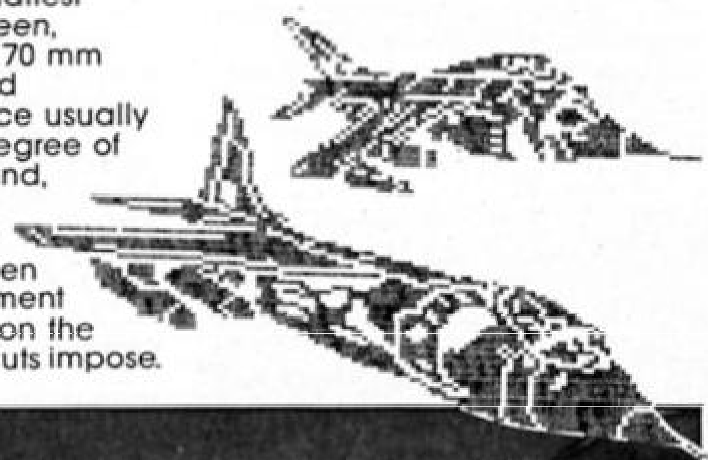


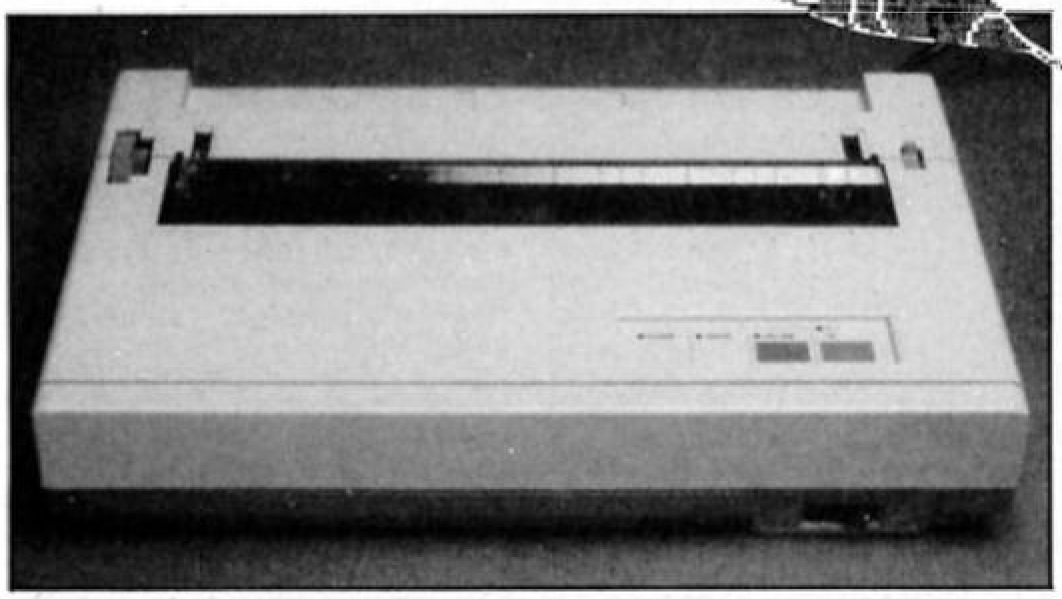
THE GREAT LITTLE PRINTER

HARDWARE

Centronics GLP II Printer
Saga Systems
£199.00

This is one of the smallest "real" printers I have seen, measuring 334 x 195 x 70 mm and it is very smart and compact. Size and price usually tend to indicate the degree of flexibility of a printer and, at first sight, it did not promise a lot. However although cuts have been made, the final assessment of its quality depends on the limitations that these cuts impose.





So first of all we looked at the specifications:

Tech. Specs.

The GLP II is a 9x9 dot matrix printer giving descenders and even Sub and Superscript modes. Working at 100 cps in draft mode there is a full set of print styles; Enlarged, Double Strike, Emphasised, Condensed, Elite, Pica and Italics, and many of these can be used together in various combinations.

A switch selectable NQL (Near Letter Quality) mode is available. Print speed varies according to the mode(s) used, NLQ running at 25 cps.

Both a Centronics and an RS232C interface is fitted at the back of the printer. The max line length is 8", Normal Pica mode prints a maximum of 80 CPL rising to a maximum of 137 CPL in consensed mode.

A "Bit Image" graphics mode is available plus 12 international character sets: USA + 11 European. Two main modes of operation are offered, an Epson FX compatible and IBM PC compatible mode.

Operation

I connected it to the Spectrum (once I had found a mains plug, another economy) via the Euroelectronics ZX LPRINT 3, first by the Centronics and then by the RS232 port (after making up a lead), and with both ports it operated without any problems.

However I did have a funny five minutes when it produced all sorts of garbage and switched modes at random while using TASWORD 2. Eventually I reset the whole system and no further problems were experienced during the rest of the test period — I put it down to a voltage spike in the mains supply.

Plus

Having both serial and Centronics ports makes it instantly viable to use with a large range of machines — QL and Spectrum 128 direct — and on the Spectrum+ with peripherals; ZX Interface I, Wafadrive, Opus Discovery etc. and not forgetting the range of separate printer interfaces.

The large variety of print options included covers most types of text printing needs, but I decided to see how it performed with a special print program so I used it with TASPLUS font program and encountered no problems, except that you are limited to 48 CPL in this mode.

Print quality is excellent, especially NLQ, and I would be more than happy to use it for letters and business printing, though whether it could produce "official" documents is open to debate and personal opinion.

Minus

Economies had to be made and the most noticable is that the printer is supplied to work on single sheets of paper, however you can purchase the optional tractor feed and roll paper units.

There are only two front panel switches, ON LINE and LF, Form Feed is omitted, though CHR$ 12 will perform a FF from software control as normal.

The LF switch also doubles as the NLQ mode switch — this is an excellent idea, making switching between draft and NLQ modes quick and easy. These two switches are not the usual type but similar to the membrane switch beloved by Sir C, they do feel more positive and of better quality though!

Opinion

This is a very good printer with a carefully considered number of options that makes it ideal for the general home user.

However if you are looking for a printer with specific features: ie A Centronics ported fanfold paper feed printer; then the savings on not having an RS232 could buy you more features elsewhere. (ie Shinwa CP80).

The casing probably will not tolerate rough handling if on a portable system, but should cope well with a home permanent set up.

The DIP switches which control some of the initial functions on power up are standard and are fiddley but easily accessed. I feel that the manual is not clear enough for absolute beginners. Although the manual is well produced, it is in "note" form, all the info is there for an experienced user, the assumption seems to be that you already know about BI and creating downloadable character sets, some of the advanced functions on the machine.

A good all purpose printer, perhaps a little expensive, but well worth your consideration.

NEVER MIND THE KEYPAD — HERE'S THE INTERRUPT ROUTINE



If you've got a 128 and are thinking about buying the add-on keypad, then Toni Baker's program could save you £20!

The Spectrum 128 comes complete with a little hole in the front right hand corner for plugging in a specially designed add-on keypad, available from Sinclair (or possibly Amstrad). The keypad contains all the digits from 0 to 9, some calculator keys such as + and *, and a whole new collection of editing keys. Now the numbers and symbols aren't anything special — they're just the same keys as on the 128 keyboard, only in a different place. If you can make the effort to hold down SYMBOL SHIFT while pressing 'K' you may come to the conclusion that you don't really need a keypad after all — if only it weren't for those new editing keys. This program will do something about those too!

New keys

The new editing keys contain such functions as 'Delete Right', 'Move Left to the Start of the next word', and so on. This program is a relocatable interrupt routine which puts all of the new (and previously unobtainable) editing keys back where they belong — on the conventional Spectrum keyboard.

It makes use of two keys which on the standard Spectrum 128 are unused: they are TRUE VIDEO and INV VIDEO. Except in 48K mode, these keys are not used at all. My interrupt routine redefines them: now they are SHIFT keys. On their own they are ignored, but may be used in conjunction with other keys. 'TRUE VIDEO' now means 'Line', and 'INV VIDEO' now word 'Word'. Thus, if you hold down TRUE-VIDEO and press CURSOR-RIGHT then the cursor will move rightward to the end of the line. Similarly, if you hold down 'TRUE-VIDEO and press CURSOR-LEFT then the cursor will move to the start of the line. TRUE-VIDEO with the UP and DOWN cursor keys will move the cursor to the first and last line of the program respectively.

INV-VIDEO moves the cursor by words. If you hold down INV-

Listing

```
F5        INT_BEGIN   PUSH AF           Stack all registers except DE
C5                    PUSH BC           (Which is not used by this routine).
E5                    PUSH HL
DDE5                  PUSH IX
FDE5                  PUSH IY
FD213A5C              LD IY,5C3A        Restore IY to its normal value.
CD1C5B                CALL 5B1C,RET     Get the current value of the program
3B        INT_PC      DEC SP            counter onto the stack.
3B                    DEC SP
DDE1                  POP IX            IX:= address of label INT_PC
01E900                LD BC,00E9
DD09                  ADD IX,BC         IX: points to label INT_EXIT
FDCB376E              BIT 5,(FLAGX)
2805                  JR Z,INT_EDIT     Jump unless INPUTting.
CD3800                CALL 0038         Treat this interrupt as normal (Note:
                                        the call address may be changed to
                                        vector the interrupt handling elswhere)
DDE9                  JP (IX)           Now jump to exit routine.
FDCB0746  INT_EDIT    BIT 0,(MODE)
2808                  JR Z,INT_LCG      Jump unless in E-mode.
DD7E0B                LD A,(INT_MODE)
32415C                LD (MODE),A       Restore mode to previous value.
1806                  JR INT_LCEG
3A415C    INT_LCG     LD A,(MODE)
DD770B                LD (INT_MODE),A   Store mode for later retrieval.
3A085C    INT_LCEG    LD A,(LAST_K)     A:= Last Key accepted, possibly altered
                                        by this interrupt routine.
DDE5                  PUSH IX
E1                    POP HL
015400                LD BC,0054
09                    ADD HL,BC         HL: Points to label INT_T2_END
060B                  LD B,0B           Eleven key changes to consider.
2B        INT_DECODE  DEC HL
BE                    CP (HL)
2B                    DEC HL
2001                  JR NZ,INT_DEC2    Jump unless last key was encoded.
7E                    LD A,(HL)         A:= original (decoded) key value.
10F8      INT_DEC2    DJNZ INT_DECODE   Repeat for all eleven possibilities.
32085C                LD (LAST_K),A     Store decoded value.
DDE5                  PUSH IX
E1                    POP HL
010C00                LD BC,000C
09                    ADD HL,BC         HL: points to label INT_TABLE1
```

```
01FEFE                    LD BC,FEFE
ED78      INT_KSCAN       IN A,(C)          A:= keyboard scan of next keyrow.
A6                        AND (HL)
BE                        CP (HL)
2075                      JR NZ,INT_NORMAL  Jump unless all required bits are set
                                            (ie jump if any keys other than TRUE
23                        INC HL            VIDEO, INV VIDEO, SYMBOL SHIFT, and
CB00                      RLC B             the cursor keys pressed).
38F5                      JR C,INT_KSCAN    Repeat to test all lines.
ED78                      IN A(C)           A:= keyscan from line zero.
1F                        RRA
386B                      JR C,INT_NORMAL   Jump unless CAPS SHIFT is assumed active
3EF7                      LD A,F7
DBFE                      IN A,(FE)
17                        RLA
E638                      AND 38
4F                        LD C,A            C:= scan of TRU VID, INV VID and LEFT.
3EEF                      LD A,EF
DBFE                      IN A,(FE)
1F                        RRA
1F                        RRA
E607                      AND 07
B1                        OR C              Also include scan of UP, DOWN, and
4F                        LD C,A            RIGHT.
3E7F                      LD A,7F
DBFE                      IN A,(FE)
1F                        RRA
1F                        RRA
3002                      JR NC,INT_SS
CBF1                      SET 6,C           Also include scan of SYM SHIFT.
79        INT_SS          LD A,C            A:= scan of all required keys.
01FF15                    LD BC,15FF
BE        INT_NEW         CP (HL)
23                        INC HL
2001                      JR NZ,INT_NEW2
4E                        LD C,(HL)         Collect key value or code from table.
23        INT_NEW2        INC HL
10FB                      DJNZ INT_NEW      Repeat for all required tests.
79                        LD A,C            A will now contain either a new key value
                                            (as per the keypad), or FD (conventional
                                            cursor keys), FE (TRU VID alone or INV
                                            VID alone), or FF (anything else).
FEFD                      CP FD
381B                      JR C,INT_EDKEY    Jump if a new editing key found.
DD7E09                    LD A,(INT_COUNT)
A7                        AND A
2809                      JR Z,INT_MODIFY   Jump if more than five frames have passed
                                            since last new key detected.
DD3509                    DEC (INT_COUNT)
2804                      JR Z,INT_MODIFY   Jump if exactly five frames have passed.
DD360AFF                  LD (INT_KEY),FF   Cancel last new key.
0C        INT_MODIFY      INC C
282C                      JR Z,NORMAL       If new key not detected then jump to
                                            deal with as normal.
0C                        INC C
2819                      JR Z,INT_INCFR    Jump with TRU VID and INV VID alone
                                            (to ignore them).
FD360700                  LD (MODE),00      If cursor key detected then signal
                                            L/C mode.
1823                      JR NORMAL         And thence deal with as normal.
```

VIDEO and press CURSOR-RIGHT then the cursor will move rightward to the start of the next word (a 'Word' in this context is a sequence of anything-except-space); INV-VIDEO with CURSOR-LEFT will move the cursor leftward to the start of the next word. INV-VIDEO with UP and DOWN will move the cursor up or down by ten lines.

SYMBOL SHIFT may now be used with the cursor keys. For this purpose, SYMBOL-SHIFT may be taken to mean 'Delete'. Thus SYMBOL-SHIFT with CURSOR-LEFT produces 'Delete Left' — exactly the same as the ordinary DELETE key. SYMBOL-SHIFT with CURSOR-RIGHT, however, produces 'Delete Right', which deletes the character at the cursor position. SYMBOL-SHIFT may also be used in conjunction with either TRUE-VIDEO or INV-VIDEO, so for instance, SYMBOL-SHIFT/TRUE-VIDEO/CURSOR-RIGHT will delete everything on the current line to the right of the cursor position, and SYMBOL-SHIFT/INV-VIDEO/CURSOR-LEFT will delete the next word to the left of the cursor.

Toggle

There is one additional editing key which will appear on the new keypad. It is called TOGGLE, and its purpose is to switch between the upper screen and the lower screen, without having to go through the SCREEN option on the menu. My program uses TRUE-VIDEO and INV-VIDEO *together* as the Toggle key. Pressing both of these at the same time will produce the toggle.

My program makes other improvements to the keyboard, apart from adding new keys. The symbols (such as square-bracket and the weird-squiggle) which were previously only attainable by going into E-mode, have now been put back on the keys where they belong — *directly*. To obtain Square-Left-Bracket new, all you have to press is SYMBOL-SHIFT/Y. Only the Copyright Symbol has moved — this can now be obtained with SYMBOL-SHIFT/I.

Graphics Mode, too, is improved. Previously, G-mode suffered from two disadvantages: the cursor keys didn't work; and keys 'T' to 'Z' produced some strange effects. My program changes all this. You can now use both the original cursor keys, and the new editing keys, in G-mode exactly as you would normally. (To get the inverse of graphics 1 to 8 you must now use SYMBOL-SHIFT, as CAPS-SHIFT with numbers will not work).

Input

One final point — users of the Spectrum 128 may have noticed

that the new Full Screen Editor isn't used for INPUT. If you type INPUT A$ then you'll find that all the keywords on SYMBOL-SHIFT actually come out as keywords. Furthermore, in G-Mode keys 'T' to 'Z' will all come out as keywords (with Graphic-T being SPECTRUM, and Graphic-U being PLAY). If you have a keypad you'll find that your lovely new editing keys don't work — and in fact come out as keywords! This program makes a special check for INPUT, and temporarily deactivates itself during INPUT. This means that the Spectrum behaves normally during INPUT. Ths is necessary for two reasons: (i) it MUST be possible to obtain the keyword STOP on SYMBOL-SHIFT/A to break out of an input, and (ii) the new editing keys don't work during INPUT anyway.

This program is completely relocatable. It may be placed in memory anywhere you like (but see warning below). To activate it you must store an interrupt vector (a pointer to the start of the routine) at an address whose low part is FF. The *I* register must contain the high part of the address of this vector, and finally IM 2 must be selected. To de-activate the routine simply select IM 1.

A word of warning

On the Spectrum 128, Interrupt Vectors may only be placed between 80FF and BEFF inclusive. An interrupt routing itself must exist wholly between 400 and BFFF. This is because address C000 to FFFF are pageable, and should an interrupt occur whilst the wrong 16K RAM is paged in you will invariably get a crash. The ROM area is also constantly pageing between the two ROMs so you can't use this as a vector either. The (new) ROM constantly uses RAM page 7 — the normal page selected by BASIC is RAM page 0. If an interrupt vector or routine exists between C000 and FFFF in RAM page 0, and an interrupt occurs whilst RAM page 7 is paged in, the results will be catastrophic. Be warned.

That said, I'll leave you to type the routine in and SAVE it. It's well worth doing. I for one have found the new editing keys extremely useful indeed. See you soon, and Blessed be.

Stop press. . . .

Since Amstrad's take over of Sinclair Research development of components such as the 128 keypad is under review, so this program could prove very valuable to 128 owners until the keypad's future is decided.

```
DDBE0A      INT_EDKEY   CP (INT_KEY)
DD770A                  LD (INT_KEY),A        Store new editing key in variable.
DD360905                LD (INT_COUNT),05     Restore frame count to five.
2807                    JR Z,INT_INCFR        Jump unless key has changed.
32085C                  LD (LAST_K),A         Store new key.
FDCB01EE                SET 5,(FLAGS)         Signal "New key detected".
2A785C      INT_INCFR   LD HL,(FRAMES)
23                      INC HL
22785C                  LD (FRAMES),HL        Increment FRAMES variable,
7C                      LD A,H
B5                      OR L
202A                    JR NZ,INT_EXIT
FD3440                  INC (FRAMES.hi)
1825                    JR INT_EXIT
CD3800      INT_NORMAL  CALL 0038             Now carry out normal interrupt functions
                                              (Note: the call address may be changed
                                              to vector interrupt handling elsewhere).
DD7E0B                  LD A,(INT_MODE)
32415C                  LD (MODE),A           Restore the mode correctly.
3A085C                  LD A,(LAST_K)         A:= Key value of key just detected (if
                                              any).
FEA3                    CP A3
3815                    JR C,EXIT             Jump if key value is OK.
DDE5                    PUSH IX
E1                      POP HL
013E00                  LD BC,003E
09                      ADD HL,BC             HL: points to label INT_TABLE2
01FF0B                  LD BC,0BFF
BE          INT_ENCODE  CP (HL)
23                      INC HL
2001                    JR NZ,INT_ENC2
4E                      LD C,(HL)             C:= Encoded key value.
23          INT_ENC2    INC HL
10F8                    DJNZ INT_ENCODE       Repeat to encode all eleven allowed
                                              values.
FD71CE                  LD (LAST_K),C         Store encoded value as last key.
FDE1        INT_EXIT    POP IY
DDE1                    POP IX
E1                      POP HL
C1                      POP BC
F1                      POP AF
FB                      EI
C9                      RET
00          INT_COUNT   DEFB 00
FF          INT_KEY     DEFB FF
00          INT_MODE    DEFB 00

The remainder of the routine consists of data, as follows:

INT_TABLE1              1E 1F 1F 03 03 1F 1F 1D
                        77 FE 6F FE 6D AD 6B AC
                        4F AF 6E AE 75 A6 73 A5
                        57 A8 76 A7 1F 0C 3E AA
                        0F B4 2E B3 17 B1 36 B0
                        67 A9 5F FD 7E FD 7D FD
                        7B FD
INT_TABLE2              C6 5B C5 5D E2 7E C3 7C
                        CD 5C CC 7B CB 7D AC 7F
                        C7 8C C8 8F C9 89
INT_T2_END              00
```

WIN A SPECDRUM

There are five of Cheetah's highly rated percussion systems to be won, plus 20 Cheetah 125 joysticks for the runners up.



COMPETITION

Enter this competition and you can convert your Spectrum into a drum machine. The Specdrum digital drum system is a peripheral that will be invaluable if you want to make music with your micro. It comes complete with a comprehensive manual and software that starts you off with a kit of eight digitally recorded drum sounds including bass drum, high hat, hand claps, cowbell, tom toms and snare. You can add new sounds from tape and there's a filing system which will store over 1,000 programmed rhythms.

If it all sounds a bit daunting for your beeping Spectrum don't worry as you can plug the system into a hi-fi for quality sound and a thundering decibel level.

Specdrum costs £29.95 in the shops and there are five up for grabs in this competition. For twenty runners up there is one of Cheetah's new 125 joysticks which feature four fire buttons, two in the handgrip and two on the base for two-hand firing. There's also an auto fire switch to give you continuous shooting.

How to enter

Below are clues to the names of three types of drum. Simply identify the name of the drum and fill out the answers on the coupon. Send your coupon to Specdrum Competition, ZX Computing Monthly, No 1 Golden Square, London W1R 3AB. Entries to be received by first post on July 4th 1986.

The Clues

1. You boil water in it.
2. A trap set for small animals or birds.
3. Thomas twice.

The competition is open to all ZX readers except employees of Argus Specialist Publications, Cheetah Marketing and Alabaster Passmore. The editor's decision is final and no correspondence can be entered into.

Specdrum Competition Entry Form

The names of the drums are

1 ....

2 ....

3 ....

Name ....

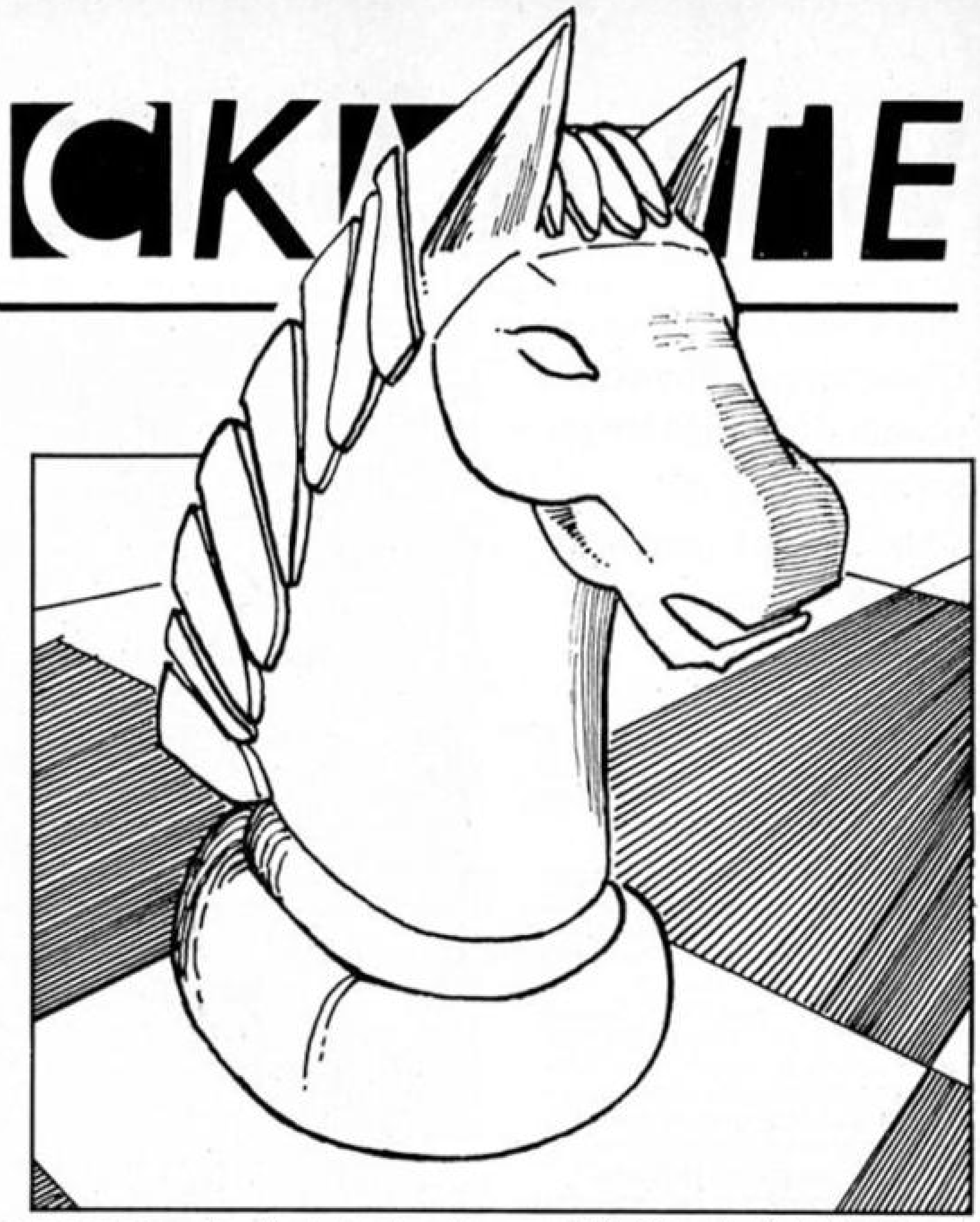
Address ....

....

....

Complete this coupon and send it to: Specdrum Competition, ZX Computing Monthly, No 1 Golden Square, London W1R 3AB. Closing date is July 4th 1986. Please remember to write your answers on the back of the envelope.

CHECKMATE



Supremacy over your chess program can be yours if you are prepared to make the sacrifices. Brian Becket makes his move against QL Chess, Chess The Turk, Psions Spectrum Chess and Specchess II.

Bringing your Sinclair to a quick, decisive defeat can be intellectually rewarding and illustrates the (current) weakness in microcomputer play. In the examples that follow, I have taken a level of play which gives the computer between four and five minutes to make its move. This matches the QL's Level-11 and is roughly of a tournament standard without making experimentation difficult with endless time delays. For each program, the levels are: QL Chess, Level-11; The Turk, Level-4 (in the plays illustrated, The Turk does not take its full ten minutes for this level), Specchess II, 4.5 minutes per move; and Psion's Spectrum package, Level-5. For the QL, I delayed making a move for a minute or so to give the computer the advantage of its ability to analyse while waiting.

Have a look at the two classic chess problems shown (White plays up the board in both). Problem A is White to move and mate in 5 but none of the Spectrum programs get it right. Correct play begins with White's Q-Q5+ (the + denotes check) followed by N-BX+ after Black moves to R1. All the Spectrum programs get this far without a hassle but fall down on the next move. The Knight check forces the Black King back to N1 and the obvious answer to move the Knight for a discovered check by the Queen. The programs, however, move the Knight to either B5 where it came from or to K5 when the answer is to move it to R6 for a double check.

The Spectrum then continues repeating the same two move sequence — in effect obeying its prime directive of avoiding defeat by gaining a stalemate through perpetual check — but it overlooks a win! After N-R6 (double check), White plays Q-N8+. the Black Rook at N1 is forced to take the sacrificed White Queen to block its own King in the corner. White then plays the Knight back to B7 for checkmate. The QL solves the problem with ease as it does Problem B.

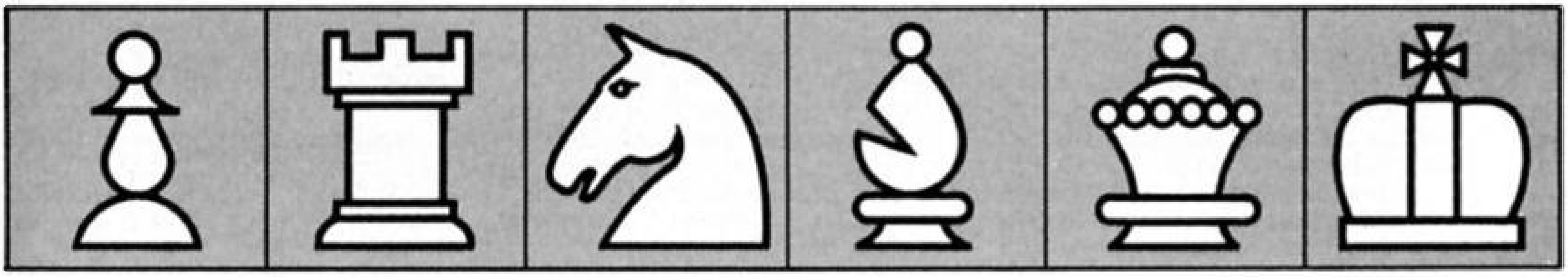
Problem B is White to play and mate in 3. The Turk chooses K-B4 and Specchess II, RxP but both are useless. The Psion program for the Spectrum, on the other hand, moves N-N6+ which is correct. What is more impressive is the fact that Psion gets the second, critical move right as well. N-N6+ forces the Black King to R2 whereupon White sacrifices the Rook (at B7) with RxP4. Black is forced to take the Rook and, whichever way it is done, White's next move gives checkmate. Giving away material to gain positional advantage or momentum is a subtle form of attack and any computer algorithm which exploits it is capable of being a strong opponent.

Sacrifice

Fortunately (for us) the Spectrum programs are highly vulnerable to a well-thought-out sacrifice and QL Chess isn't all that much better.

Vulnerability to bold sacrifices and imaginative chess attacks are not just a weakness or Sinclair programs. At the moment, chess algorithms are not able to make a micro duplicate of mimic the sort of creative thinking that underlies truely skillful play. In some cases, the program will fall into traps that any half-way skilled human would avoid like the plague because there is a sort of blind spot in the algorithm which leads it to miscalculate or overlook the disadvantage in taking an immediate material gain. It is this literalness or rigidity in chess algorithms that often lead the computer to make some very silly mistakes.

Look at Games I(a) and I(b) and taking White play them out on a board or, if you have one of the programs, on the Spectrum. White's games are hardly master chess but both The Turk and Specchess II push the King's Rook Pawn forward to threaten the attacking Bishop which immediately allows White's Q-R5+ and mate in one move. Both programs fall for a fool's mate that a half-way bright, human beginner would only be caught by once. This, of course, is the main drawback to playing against a computer; all things being equal, it will always make identical mistakes in identical



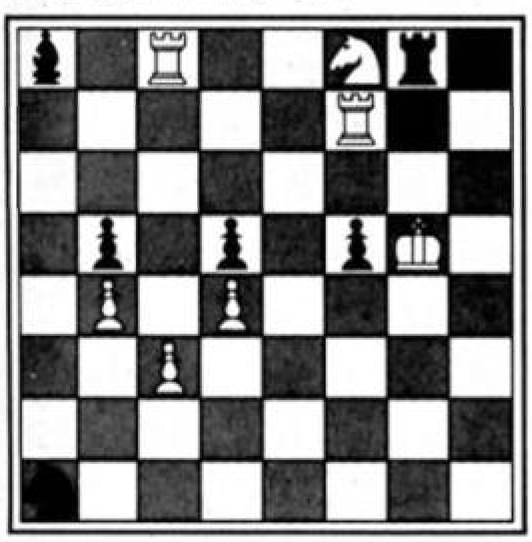
games and once you beat one variation you have to go on to another or lose interest. Eventually you will exhaust the computer's data banks of openings and its a case of either getting another program or going on to the high levels where a game will last many hours.

Again playing White, work through Games II(a) and II(b) which show Spechess II and the microcomputer champion QL Chess losing to a blitz checkmate after taking a freely offered Knight. Again White's play isn't especially brilliant chess but it does exploit blind spots in the programs in a number of the computer's responses to the Queen's Gambit opening although the exact sequence of moves will differ. Psion's Spectrum chess package (having a very limited number of replys to Queen's Pawn openings) does not fall for the same line of play but it is possible to defeat it with a similar pattern of attack which exploits weaknesses on the King's side. At Level-5, I beat it in 24 moves and perhaps the reader can do better.

These foibles are not unique to Sinclair programs which are as good or better than anything available for other home computers and QL Chess is in a class by itself. When I first got my QL Chess, a rash and boastful Commodore owner equipped with Sargon II challenged me to a computer match. Somewhere along the line, he learned that Sargon II didn't have a prayer and conveniently forgot to show up on the day. Psion has adopted the QL Chess algorithm for the Apple and IBM and I sincerely hope they get around to the 128K Spectrum.

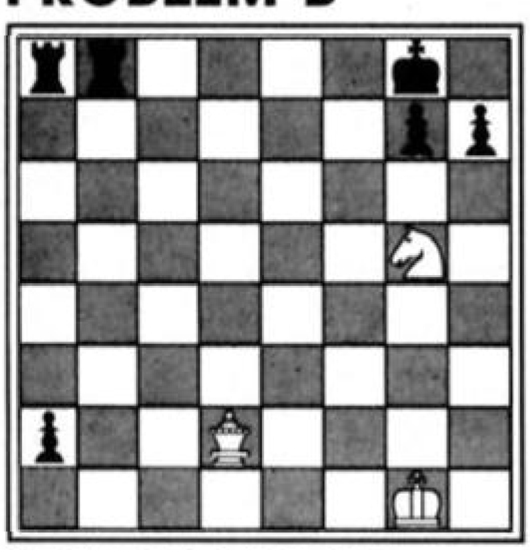
For the Spectrum, the Psion/Sinclair package plays the strongest game in many ways and would make a good candidate for the 128K but the company seems to have lost interest in this algorithm. Otherwise an expanded Spechess II or The Turk would do well on the 128K. With its excellent set of options, The Turk would be a good choice for up-grading.

PROBLEM A



White (Spectrum) to play and mate in 5.

PROBLEM B



Mauritius v Greisch (1905). White (Spectrum) to play and mate in 3.

GAME I

	A: WHITE	A: SPECHESS II		B: WHITE	B: THE TURK
1.	P-Q4	P-KB4	1.	P-Q4	P-KB4
2.	B-KN5	N-QB3	2.	P-K4	PxP
3.	P-K3	P-Q4	3.	B-KN5	P-KR3!
4.	B-QN5	B-Q2	4.	Q-R5+	P-KN3
5.	N-QB3	P-QR3	5.	QxP Mate	
6.	B-QR4	P-QN4			
7.	B-QN3	P-KR3!			
8.	Q-R5+	P-N3			
9.	QxP Mate				

Here the Spectrum tries a fairly bold reply to the player's Queen's Pawn opening and finds itself in a quick fool's mate.

GAME II

	A: WHITE	A: QL		B: WHITE	B: SPECHESS II
1.	P-Q4	P-Q4	1.	P-Q4	P-Q4
2.	P-QB4	P-K3	2.	P-QB4	P-K3
3.	P-K3	N-QB3	3.	P-K3	B-QN5+
4.	P-KR3	N-KB3	4.	B-Q2	N-QB3
5.	N-KB3	B-Q3	5.	P-QR3	B-K2
6.	Q-B2	O-O	6.	Q-B2	N-KB3
7.	N-QB3	B-K2	7.	N-KB3	O-O
8.	B-Q3	PxP	8.	B-Q3	Q-Q3
9.	BxP	Q-Q3	9.	P-B5	Q-Q1
10.	B-Q3	P-QR3	10.	N-QB3	P-QN3
11.	N-KN5	P-KR3	11.	N-KN5	PxP
12.	P-KR4	PxN	12.	PxP	P-KR3
13.	PxP	N(QB3)xP	13.	P-KR4	PxN
14.	B-R7+	K-R1	14.	PxP	N-K1
15.	P(K3)xN	QxP(Q5)	15.	B-R7+	K-R1
16.	PxN	R-K1	16.	B-N8+	KxB
17.	B-N8+	Q-KR5	17.	Q-R7 Mate	
18.	RxQ+	KxB			
19.	Q-R7+	K-B1			
20.	QxP Mate				

Here the QL and the Spectrum play a standard defence to White's Queen's Gambit opening. White, playing a less orthodox game, sacrifices a Knight and a Bishop to get a quick checkmate. Even the microcomputer champion QL Chess is unable to see the danger until its too late.

The same ploy works against many of QL Chess's defences against the Queen's Gambit at its tournament levels of play.

RANDOM MEMORY

If you have ever typed in a line from a magazine program such as:
100 LET x = x + (INKEY$ = "8") + (INKEY$ = "5") you've already used the Spectrum's logic capabilities without realising it.

I'm not going into much detail in this article as to how relations and logical operators work. If you want a detailed account read Chapter 13 in your manual. Rather let's keep to the point and see how they can be great byte savers. Take the example above. This occupies 25 bytes (memory spaces). The equivalent in ordinary BASIC would be:

100 IF INKEY$ = "8" THEN LET x = x + 1
110 IF INKEY$ = "5" THEN LET x = x − 1

This takes up 48 bytes, (and runs slower!)

True or false

The basic idea is that if the relation INKEY$ = "8" is true, i.e. you are pressing the 8 key, the expression in the first bracket is returned as 1. You cannot therefore be pressing the 5 key (as INKEY$ can only read one key at a time) so the second relation in brackets is false and returns as 0. So x becomes its present value + 1 − 0, i.e. it is increased by 1, and the laser base or whatever would be printed one column further across the screen. If you work out what happens when you press 5 you'll see that x = its present value + 0 − 1, i.e. one less.

The problem with such a line is that x can become less than 0 or more than 31, and run off the screen. To prevent this you have to make sure that x remains between 0 and 31. Two lines would do this:

120 IF x>31 THEN LET x = 31
130 IF x<0 THEN LET x = 0

It takes up another 54 bytes, but using the logical operator AND you can include the limitation in the original line:

100 LET x = x + (INKEY$ = "8" AND x<31) − (INKEY$ = "5" AND x>0)

The amended line takes up only 46 bytes all told (instead of 104!). Now, the first bracket is only true if you are pressing 8 AND x is less than 31. Both must be true if all is to be true, i.e. returned as 1. The other relations are =, which is the opposite of >, >= (opposite of<), and<>. The other logical operators are OR and NOT. OR returns 1 if either or both relations are true, NOT returns 1 if the relations are not true. So x<>y is the same as NOT x=y!

Enough of this before you're completely confused. (Apologies to the NOT "faint hearted" who have slogged through and mentally digested the infamous Chapter 13!). Let's look at some other uses.

The problem with INKEY$ is that it only reads one key at a time, so diagonal moves are not possible. Using IN solves the problem. The routine listed below divides the keyboard into four areas. Top row of keys for up, bottom row for down, left half of centre two rows for left, and right halves for right.

10 LET x = x + (IN 49150 + IN 57342<>510) − (IN 64510 + IN 65022<>510) : LET y = y + (IN 65278 + IN 32706<>510) − (IN 63486 + IN 61438<>510)

No more fumbling for those cursor keys!

Routines to let

Here are some more routines which use LET. For instance the line:

10 LET x = a = b

It doesn't seem to make much sense but that's because = only means "make equal to" between the x and the a. Between the a and the b it is a relational operator and means "the same as". So, if a is the same as b the expression makes x equal to 1. If it is not it returns 0. The expression occupies 11 bytes. Its usual equivalent takes up 38 bytes:

10 IF a = b THEN LET x = 1
20 IF a<>b THEN LET x = 0

See how logic saves you space! If you want x to equal say 10, not 1 there is no problem. Just change the line to:

10 LET x = (a=b)=10

If (a=b) is true it returns as 1, so x becomes 1 = 10. If it is not true then x = 10 = 0, i.e. 0. You can also use this system to increment score(s) if, say a keypress (INKEY$) matches a chosen number (n):

10 LET s = s + (INKEY$ = STR$ n)

Note that the number n has to be converted to a string (STR$) or you'll get an error. Here's another routine you might find a use for:

10 LET a = 1
20 LET a = NOT a
30 PRINT AT 0,0; CHR$ (144+a)
40 IF INKEY$<> "" THEN RETURN
50 GOTO 20

CHR$ 144 is the first udg. If you designed this as a suitable fantasy creature (a raging unicorn, perhaps!) and the following udg as the same creature in a different posture, the routine will animate between the two images until you press a key to escape.

Looping the loop

This is how it works. The operator NOT means the opposite. So variable a enters line 20 as 1, but leaves as 0. Nothing is added to 144 in line 30 so unicorn mark 1 is printed. When the routine loops back to line 20, a now becomes 1, and so CHR$ (144+1) i.e. unicorn mark 2 is printed.

The process is repeated over and over again until you break out. It works very fast so you may need a PAUSE to slow it down. You could also use a FOR NEXT loop in place of the GOTO and limit the time available to escape. Take too long and you're gored to death!

Now numbers are great byte-eaters. (Remember the six hidden bytes I mentioned in the first of these articles?) So why waste bytes with:

10 IF x = 1 THEN . . . or **10 IF x <>0 THEN . . .** when you can miss out the number and just use

10 IF x THEN . . .

In the same way:
IF x = 0 THEN . . . can be replaced by **IF NOT x THEN . . .**

And here's a strange one. The line:
10 IF x<>1 AND x<>0 THEN LET x = 1 can be replaced by **10 LET x = NOT NOT x**

It really does work, though you might get your brain in a twist trying to work out why?

Moving on now to PRINTing, the rule about only if both

relations within a bracket are true will the whole be true also applies, except that it doesn't return as 1. Instead it returns as the characters in quotes. So the lines:

10 IF r = 1 THEN PRINT "RED"
20 IF r = 2 THEN PRINT "BLUE"
30 IF r = 3 THEN PRINT "GREEN"

a total of 69 bytes, can be replaced by:

10 PRINT ("RED" AND r = 1) + ("BLUE" AND r = 2) + ("GREEN" AND r = 3) taking up only 57 bytes. If none of the relations are true then nothing is printed.

Guessing game

Here's a slightly different use with PRINT. Have you ever seen in a screen display something like: "YOU HAVE 1 GUESSES LEFT"!

You could get over the peculiarities of English sentence construction with two lines:

10 IF n<>1 THEN PRINT "YOU HAVE"; n; "GUESSES LEFT"
20 IF n = 1 THEN PRINT "YOU HAVE 1 GUESS LEFT"

Here you are using a total of 86 bytes. To save 23 of these use:

10 PRINT "YOU HAVE"; n; "GUESS": ("ES" AND n<>1); "LEFT"

The "ES" will only be added if the rest of the relation is true. That is n does not equal 1.

One of the most useful applications of logical operators is to simulate the ON . . . GOTO found in many dialects of BASIC. The menu at the beginning of, say a file handling program (where storage space is at a premium) needs a routine to GOTO various subprograms on particular key presses. For instance the following lines which use 69 bytes.

100 IF INKEY$ = "1" THEN GOTO 1000
110 IF INKEY$ = "2" THEN GOTO 2000
120 IF INKEY$ = "3" THEN GOTO 3000

If, as in the above example the line numbers to GOTO are equally spaced these lines can be replaced by the single line:

100 GOTO VAL INKEY$ * 1000

This system won't work if the GOTO line numbers are irregular (and, incidentally will crash or run on past line 120 if the wrong key is pressed).

Solve the problem like this. Replace lines such as:

100 IF INKEY$ = "1" THEN GOTO 700
110 IF INKEY$ = "2' THEN GOTO 1110
120 IF INKEY$ = "3" THEN GOTO 60 with the line:

100 GOTO (600 AND INKEY$ = "1") + (1010 AND INKEY$ = "2") + (−40 AND INKEY$ = "3") + 100

If you press, say 1, only the first relation is true, the others return as 0, so you GOTO 600+0+0+100, i.e. 700, and so on. There are two interesting points here. Firstly you can go back to a line number *before* the menu routine using a minus value. So pressing 3 GOes TO 0+0−40+100, i.e. 60, and secondly, if you press the wrong key (or no key) the routine returns 0+0+0+100, and loops back to itself for another try. It thus provides a useful PAUSE plus error trap.

Trap is set

Logic can also play a part in error trapping. The following routine will only allow through a letter between A and E. Anything else is rejected:

10 IF INKEY$<"A" OR INKEY$> "E" THEN GOTO 10

The routine assumes you have CAPS LOCK set. If you think the user may unlock it a much safer way is:

10 IF PEEK 23556<65 OR PEEK 23556>69 THEN GOTO 10

The System Variable at 23556 always returns the ascii code of the upper case letter (or number) on the key pressed, whatever the state of the shift keys, so it is much more difficult to mess up.

Let's end with a pot pourri of ideas for saving the odd byte or

Clyde Bish gives some logical suggestions for saving memory in your programming.

ten. Messages appearing in the edit area, lines 22 and 23, (PRINTed using#0) can be cleared by using simply INPUT; rather than the more "expensive" PRINT#0;" (32 blank spaces) ".

Text on the lower part of the main screen, for example, below a map or illustration, can be cleared by using **INPUT AT x, 0;**

Where x = number of lines to be cleared + 1. The current PRINT position must be above the area to be cleared or the screen display will scroll. So, to clear the bottom five lines of screen (assuming the PRINT position was below row 17) use:

PRINT AT 0, 0; : INPUT AT 6, 0; which is 33 bytes shorter than the more usual **FOR f = 17 TO 21 : PRINT AT f, 0;" (32 spaces) " : NEXT f**

If you need to clear rows in the central area of the screen you will have to resort to this loop method, but with a difference; there is no need to use 32 blank spaces. Two commas will do the job! So, to clear rows 10 to 15 use:

FOR f = 10 TO 15 : PRINT AT f, 0,, : NEXT f

A saving of 30 bytes.

Subroutines

Two points about subroutines. Firstly don't assume that using a subroutine will always save you bytes. There's no point in having a subroutine you only call once! Also, a small subroutine and its call may take up more bytes than just including the routine each time you need it. Secondly, never jump out of a subroutine. Always leave by way of a RETURN. Calling a subroutine puts 18 bytes on the memory stack. When you RETURN these come off, but if you jump out they stay and the stack grows until memory is used up. You can, of course, call one subroutine from another, or even have a subroutine call itself, provided you eventually use RETURN to go back to the main program.

The little understood and therefore little used DEF FN command can also save a lot of bytes if used sensibly. Look in your manual for the various forms of syntax but here's a simple use. Say you have an adventure where some outcome is determined by the throw of a dice, Dungeons and Dragons style. Normally you would need to include each time a line such as:

IF INT(RND * 6 + 1) = . . .

Subroutines won't help here as you'll probably want to compare it with a different variable each time, but DEF FN will. First define your function with

DEF FN r() = INT(RND * 6 + 1)

Then whenever you need the dice throw use **IF FN r() = . . .**

If you want the total of two dice use:

DEF FN r() = INT(RND * 6 + 1) + INT(RND * 6 + 1)

Because of the way numbers are held, numeric DATA always takes up a lot of space. If variables are set for numbers e.g. LET o = 0 then a great deal of space can be save. This can be put to good effect using the BEEP command.

A succession of BEEPs to play a tune would obviously by byte-wasting, so use a loop, set to the number of notes to be played, READ the length and pitch of each note from DATA, and BEEP using the variables read:

10 FOR f = 1 TO 10 : READ 1, p : BEEP 1, p : NEXT f
20 DATA . . .

If you declare variables with capital letters the same as the name of the note — A, B, C etc. (use TC for top C, Bb for B flat, C# for C sharp), and others for the note length, declaring the shortest first, then the others in terms of this one (e.g. q=.5 (for quaver); k=q+q (for crotchet — you've already used c!); dk=q+q+q (for dotted crotchet) etc.) you can enter the BEEP DATA directly from the stave music simply by entering the variables for the note length and pitch.

RANDOM MEMORY

CLASSIC GAMES OFFER

In an exclusive offer ZX and OCP are offering readers three of their Classic Games range for the price of one.



Take advantage of this offer and you can add Video Pool, Casino Royal and Chess the Turk to your software collection for under £7. Each game retails in the shop at £5.95 so that's a saving of nearly £11, and whether you're a pool shark, a high roller or a grandmaster that has to be a real bargain.

Video pool is a sophisticated pool simulation which uses cursor control to give you pin-point accuracy for your pots. You can opt to clear the table against the clock or play a two-player game. The two-player game itself has two variations— one where you must clear the balls in their numerical order and an even harder game where you must pot the balls into the pockets bearing the same number.

Roulette and pontoon are included on Casino Royal which brings you the tragedy and triumphs of life at the gaming tables. Roulette can be played by up to six players and includes full details on how to play the game. Both games make use of the Currah Speech Unit.

Chess the Turk is a powerful chess game for the Spectrum which incorporates features such as a demo mode. replay and 'blitz chess'. There are six levels of play and if you are cornered you can also resort to a help mode for a suggestion.

ZX/OCP Classic Games Offer Coupon

Please send me Video Pool, Casino Royal and Chess the Turk for the special price of £5.95 + £1 postage and packing.

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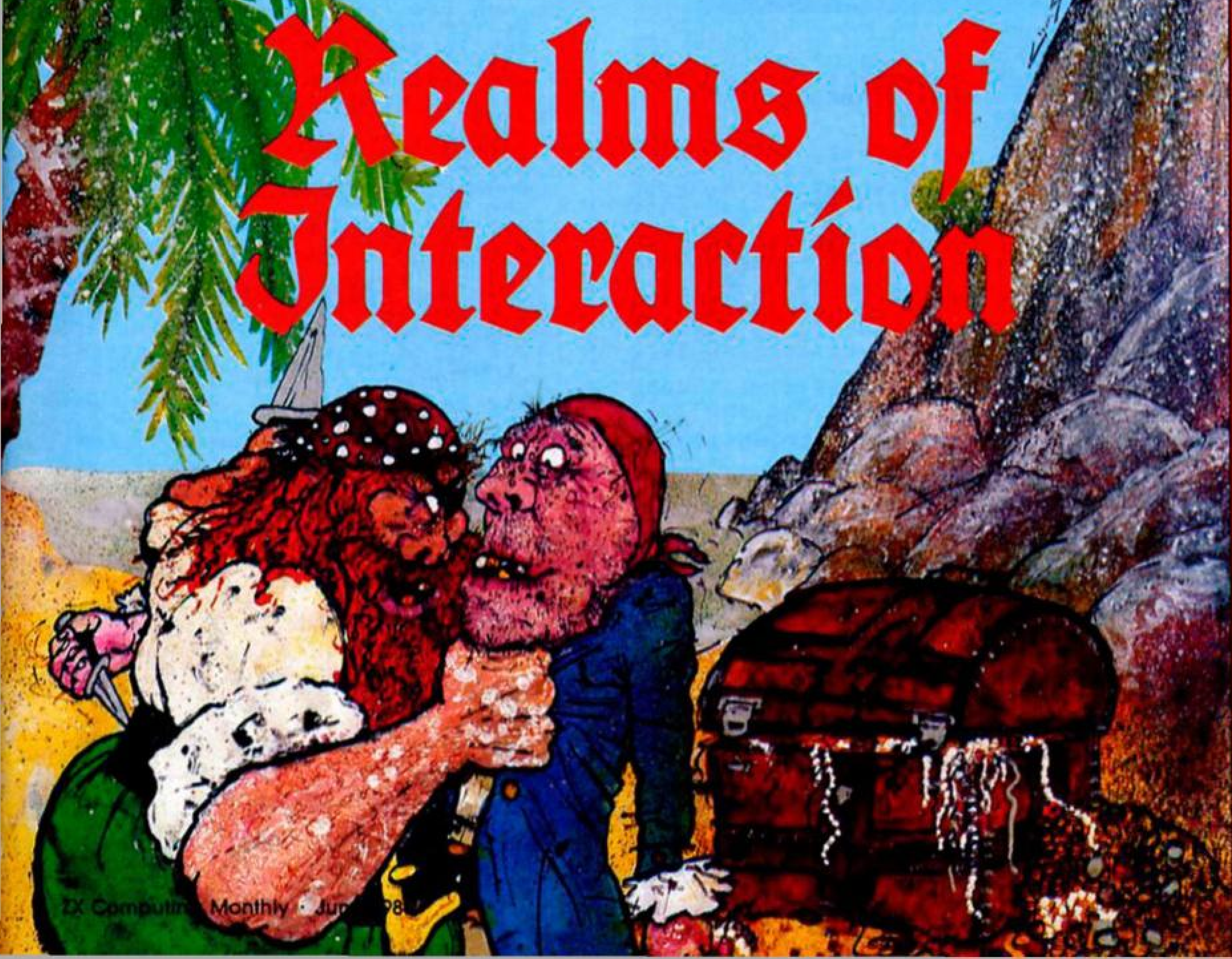
Realms of Interaction

This month Alan Davis starts to build up a world for your adventure characters to inherit.

Last month we looked at some of the advantages — and problems — of writing adventure games set in an imaginary world which is "inhabited" by computer-controlled characters — characters which give the illusion of leading their lives independently of the player. In this second article in the series we're going to put together a simple world for our characters to inhabit, and also come to grips with some powerful string handling routines. There's quite a lot of ground to cover, so let's get straight down to business.

Listing 1, together with the "z$print" machine code routine from last month's article, forms what we might call the basic program module for the series. In fact more than half of Listing 1 is concerned with setting up the data and defined functions we'll need in order to bring the independent characters to life in later articles. To get the program running, enter **CLEAR 59999** as a direct command, and type in Listing 1. DON'T attempt to run this yet! Load in the "z$print" code you saved last month, and then type: **GOTO 9998.** The program will save itself, and the machine code, to tape.

Rewind the tape, **NEW** the Spectrum, and load in the program (which will autorun from line 8000, loading the bytes automatically.) After a few seconds you'll find yourself in control of our good friend Merlin the Magician, with six single key commands at your disposal. The N,S,E and W keys will turn Merlin around to face the appropriate compass direction, with the text description reflecting any changes in the view he sees. The M key will move him one location in whatever direction he's currently facing. The I key — for Inventory — won't do anything at this stage, and neither will Merlin encounter any other characters or objects as he moves about. This is all as it should be: we're lacking three short but crucial machine code routines which we'll deal with next month.



Map of the world

If you can tear yourself away from your new friend for a minute or two, we ought to take a look at Listing 1 in more detail. The various REMs should help you to find your way around the program, but the following comments may be useful:

1) All printing of text to the screen is achieved by first building up the message in the BASIC variable z$, and then using the "z$print" machine code routine from last month's article. The subroutine at line 100 adds a full stop to the contents of z$ before making the USR call at 64505. Incidentally, USR 3582 is a call to the Spectrum ROM for scrolling the screen upwards by one line.

2) Lines 200-300 prompt for a single keypress and decode it (if acceptable) into a number between 1 and 6 inclusive, stored in the variable v; v = 5 corresponds to a movement command, and v = 1, 2, 3, or 4 to a rotation command. The "current direction" is held in variable d. The inclusion of a real time feature might seem pointless at present, since nothing ever happens! Never fear, things will change!

3) Movement occurs within a 5 x 5 grid which forms a "world" of 25 locations. Variables io and jo store the two coordinates which define Merlin's position within this grid: io = 1 represents the furthest north that Merlin can go, and io = 5 the furthest south. Similarly jo = 1 marks the western limit, and jo = 5 marks the eastern edge. The variables ti and tj are used as flags to prevent the program trying to describe an "impossible" location which is off the world map (see lines 1020, 1030), and to enable it to describe the location directly ahead when this is within the map.

4) The array l(5,5) effectively stores the map of the world, whose layout can be seen in the DATA statements for lines 9530-9534 inclusive. Each element of the array stores a numeric code (between 1 and 5 inclusive) corresponding to one of the location descriptions held in the array l$(). For example, if io = 2 and jo = 1, then l(io,jo) = 4 (see line 9531). So this location corresponds to the 4th item in l$(): "a thatched cottage".

5) Character names, objects, location names, and compass directions are held in the arrays p$(), o$(), l$() and d$() respectively, each string of text being preceded by either one or two character codes. The job of extracting information from these arrays to generate text messages is performed by the various functions defined in lines 10-40. The purpose of the character codes is to define the length of the text message to be extracted, and so eliminate unwanted spaces.

Demo routine

It may not be immediately obvious just how these defined functions work, and you might find Listing 2 helpful in this respect. (Listing 2 is purely a demonstration routine, and isn't intended to be a permanent part of the basic program module.) Once you have the main program running (and a copy saved on tape), **BREAK,** and add the program lines in Listing 2. Then enter **GOTO 9800**, put your feet up, and all will be revealed! The demonstration will show you, far better than could be explained in words, exactly what each function does. And at the end it will show you the power of these functions by generating a wide variety of text messages for as long as you have the stamina to keep

Listing 1

```
   1 REM   INTERACTIVE CHARACTER
   2 REM   BASIC MODULE
   3 REM
   4 REM
   5 REM *** Defined functions
   6 REM
  10 DEF FN n$(x)=p$(x,3 TO CODE
 p$(x,1)): DEF FN p$(x)=p$(x,3 T
O CODE p$(x,2))
  20 DEF FN a$(x)="a "+o$(x,2 TO
 CODE o$(x,1)): DEF FN t$(x)="th
e "+o$(x,2 TO CODE o$(x,1))
  30 DEF FN l$(x)=l$(x,2 TO CODE
 l$(x,1)): DEF FN m$(x)=("on" AN
D x=2)+("in" AND (x=1 OR x=3 OR
x=5))+("by" AND x=4)+" "+FN l$(x
)
  40 DEF FN d$(x)=d$(x,2 TO CODE
 d$(x,1))
  97 REM
  98 REM *** Print string z$
  99 REM
 100 LET z$=z$+".": LET m=USR 64
505: LET z$="": RETURN
 197 REM
 198 REM *** Wait for input
 199 REM
 200 LET m=USR 3582: PRINT #1; I
NK 4;AT 0,0;"N,S,E,W, (look) or
M (move)"'"I for inventory": PAU
SE 500: LET x$=INKEY$: PRINT #1;
AT 0,0,,,,
 210 IF x$="" THEN LET z$="Time
passes": GO SUB 100: GO SUB 2000
: GO TO 200
 220 LET v=(1 AND x$="n")+(2 AND
 x$="s")+(3 AND x$="e")+(4 AND x
$="w")+(5 AND x$="m")+(6 AND x$=
"i"): IF NOT v THEN GO TO 200
 230 IF v=5 AND ((d=2 AND io=5)
OR (d=1 AND io=1) OR (d=3 AND jo
=5) OR (d=4 AND jo=1)) THEN LET
z$=FN n$(1)+" decides to go no f
urther towards the "+FN d$(d): G
O SUB 100: GO TO 200
 240 IF v<=4 THEN LET d=v
 250 IF v=5 THEN LET io=io+(1 AN
D d=2)-(1 AND d=1): LET jo=jo+(1
 AND d=3)-(1 AND d=4): LET z$=FN
 n$(1)+" moves "+FN d$(d): GO SU
B 100
 290 IF v<>6 THEN GO SUB 1000
 300 GO SUB 2000: GO TO 200
 997 REM
 998 REM *** Describe location
 999 REM
1000 LET z$=FN p$(1)+" is standi
ng "+FN m$(l(io,jo))+", looking
"+FN d$(d)
1020 LET ti=(-1 AND io<>1 AND d=
1)+(1 AND io<>5 AND d=2): LET tj
=(-1 AND jo<>1 AND d=4)+(1 AND j
o<>5 AND d=3)
1030 IF ti OR tj THEN LET z$=z$+
" towards "+FN l$(l(io+ti,jo+tj)
)
1050 GO SUB 100
1997 REM
1998 REM *** Independent Action
1999 REM
2000 RETURN
7997 REM
7998 REM *** Load machine code
             and initialise
7999 REM
8000 CLEAR 59999: LOAD ""CODE
9000 BORDER 0: PAPER 0: INK 7: C
LS : LET d=1: LET io=2: LET jo=1
: RESTORE : DIM p$(6,25): FOR i=
1 TO 6: READ x,y,z$
9010 LET p$(i,1)=CHR$ x: LET p$(
i,2)=CHR$ y: LET p$(i,3 TO )=z$
9020 NEXT i
9030 DIM o$(8,15): FOR i=1 TO 8:
 READ x,z$
9040 LET o$(i,1)=CHR$ x: LET o$(
i,2 TO )=z$
9050 NEXT i
9060 DIM l$(5,20): FOR i=1 TO 5:
 READ x,z$
```

pressing a key! Actually, a careful study of lines 9920-9940 will repay the effort, since these program lines are entirely responsible for the remarkable range of text messages generated in the demonstration.

Of course there's no *logic* in the messages generated by the demonstration program — that will come later, though you can see examples of the system in use in lines 1000 and 1030. However, it's a good idea to become familiar with this method of constructing sensible messages from their various bits and pieces as we shall be using it a good deal in the remaining articles. You might like to try rewriting lines 9920-9940 to generate a different set of text messages.

Meanwhile, what about poor old Merlin? You've probably found that he rapidly wearied of wandering about an apparently empty world. Tell him not to worry. Next month will bring a population explosion...



```
9070 LET l$(i,1)=CHR$ x: LET l$(
i,2 TO )=z$
9080 NEXT i
9090 DIM l(5,5): FOR i=1 TO 5: F
OR j=1 TO 5
9100 READ l(i,j): NEXT j: NEXT i
9110 DIM d$(4,6): FOR i=1 TO 4:
READ x: READ z$
9120 LET d$(i,1)=CHR$ x: LET d$(
i,2 TO )=z$: NEXT i
9500 DATA 8,21,"Merlin the Magic
ian"
9501 DATA 9,25,"Timbril the wood
 sprite"
9502 DATA 13,20,"Sir Godfrey of
Lea"
9503 DATA 8,23,"Cedric the woodc
utter"
9504 DATA 9,24,"William the ston
emason"
9505 DATA 7,20,"Roger the vagabo
nd"
9510 DATA 14,"magical staff"
9511 DATA 11,"broadsword"
9512 DATA 10,"sharp axe"
9513 DATA 15,"book of spells"
9514 DATA 14,"bronze shield"
9515 DATA 13,"heavy hammer"
9516 DATA 15,"flagon of wine"
9517 DATA 13,"pile of logs"
9520 DATA 14,"a pine forest"
9521 DATA 15,"a grassy plain"
9522 DATA 20,"a secluded clearin
g"
9523 DATA 19,"a thatched cottage
"
9524 DATA 19,"a stony wilderness
"
9530 DATA 1,1,3,1,1
9531 DATA 4,1,1,1,1
9532 DATA 1,1,2,2,2
9533 DATA 5,5,2,2,4
9534 DATA 5,5,2,2,2
9540 DATA 6,"north",6,"south",5,
"east",5,"west"
9700 GO SUB 1000: GO TO 200
9998 SAVE "Merlin" LINE 8000: SA
VE "mc"CODE 64500,203
```

Listing 2

```
9797>REM
9798 REM *** Examples of string
             manipulation
9799 REM
9800 CLS : LET z$="FN n$()": GO
SUB 9980: FOR i=1 TO 6: LET z$="
FN n$("+STR$ i+"):"+FN n$(i): GO
 SUB 100: NEXT i
9810 GO SUB 9970
9820 LET z$="FN p$()": GO SUB 99
80: FOR i=1 TO 6: LET z$="FN p$(
"+STR$ i+"):"+FN p$(i): GO SUB 1
00: NEXT i
9830 GO SUB 9970
9840 LET z$="FN a$()": GO SUB 99
80: FOR i=1 TO 8: LET z$="FN a$(
"+STR$ i+"):"+FN a$(i): GO SUB 1
00: NEXT i
9850 GO SUB 9970
9860 LET z$="FN t$()": GO SUB 99
80: FOR i=1 TO 8: LET z$="FN t$(
"+STR$ i+"):"+FN t$(i): GO SUB 1
00: NEXT i
9870 GO SUB 9970
9880 LET z$="FN l$()": GO SUB 99
80: FOR i=1 TO 5: LET z$="FN l$(
"+STR$ i+"):"+FN l$(i): GO SUB 1
00: NEXT i
9890 GO SUB 9970
9900 LET z$="FN m$()": GO SUB 99
80: FOR i=1 TO 5: LET z$="FN m$(
"+STR$ i+"):"+FN m$(i): GO SUB 1
00: NEXT i
9910 GO SUB 9970: LET z$="SENTEN
CE CONSTRUCTION": GO SUB 9980
9920 LET r1=INT (1+6*RND): LET r
2=INT (1+6*RND): LET r3=INT (1+8
*RND): LET r4=INT (2*RND)
9930 IF r1=r2 THEN LET z$=FN n$(
r1)+(" studies " AND NOT r4)+("
throws " AND r4)+FN t$(r3)+(" ca
refully" AND NOT r4)+(" away" AN
D r4)
9940 IF r1<>r2 THEN LET z$=FN n$
(r1)+(" asks " AND NOT r4)+(" gi
ves " AND r4)+FN p$(r2)+(" for h
is opinion of " AND NOT r4)+(" "
 AND r4)+FN t$(r3)
9950 LET m=USR 3582: GO SUB 100
9960 GO SUB 9970: GO TO 9920
9970 PRINT #1;AT 0,0;"PRESS A KE
Y TO CONTINUE": PAUSE 0: PRINT #
1;AT 0,0,,,,: RETURN
9980 LET z$="DEMONSTRATION OF "+
z$: LET m=USR 3582: GO SUB 100:
LET m=USR 3582: RETURN
```

HOTSHOTS

What? Only four games on this compilation? Never mind the quantity — this is a classy quartet.

Hotshots
The Force
£9.95

Compilation tapes seem to be all the rage at the moment, and they're understandably popular with the software houses because they don't involve any development costs for new games.

For the people that buy the tapes the tapes these compilations are a mixed blessing, and the value of the tape depends not so much on the games it carries but almost entirely upon how many of the games you've already bought. Obviously if you've already got some of the games included in a particular compilation then it represents less of a bargain than it would to someone who hasn't got any of them. Still, that apart, there's no denying that compilations can give very good value for money and this latest one from The Force (a.k.a Actavision) offers four very good titles at just under £2.50 each.

Surprisingly, perhaps, the first of the two tapes kicks off with an adventure, **Mindshadow** a very recent release from Activision. It might seem a little odd to mix adventures and arcade games on the same compilation, but it seems like a good idea to me since that's probably the best way of getting dedicated arcade addicts to try out an adventure. And Mindshadow is a good choice because it comes complete with a tutorial program that acts as an introduction to adventure playing.

Melbourne House's contribution to Hotshots is **Fighting Warrior**. Released in the wake of their highly successful Exploding Fist, Warrior puts the martial arts action into an Egyptian setting. You play an Egyptian prince setting out to rescue your princess from the temple of the evil Pharoah. Rather than going through the combat bouts used in most other martial arts games, here you walk across a scrolling desert landscape in search of the temple and have to fight the demons and other creatures as they approach from the opposite direction.,

You are armed with a sword but do not have as many types of movement available to fight with as in Exploding Fist. That game offered more than a dozen different types of movement, but Fighting Warrior has only seven. This might make the game seem less sophisticated than Exploding Fist, but on the other hand it also makes it easier to get to grips with the combat (I always found the variety of moves in Fist a bit confusing).

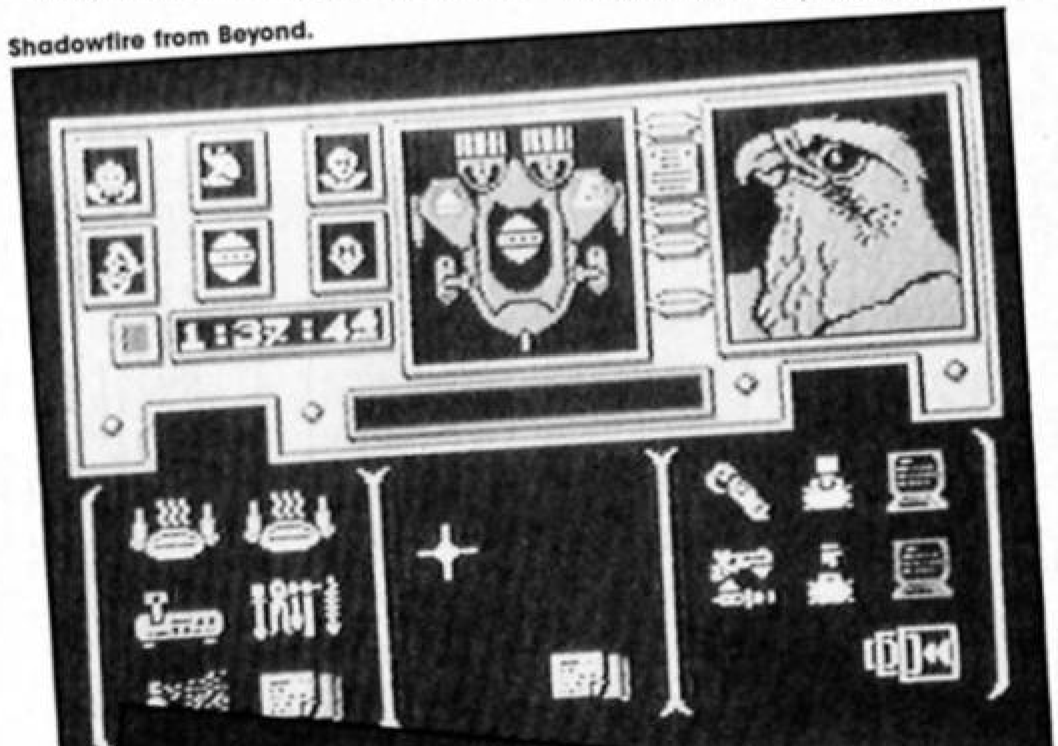
The graphics and animation are excellent, and although Exploding Fist is probably still the definitive example of martial mayhem this is a good addition to the genre.

Tape Two starts with **Gyron,** the 'mega-game' from Firebird. This is probably the title most likely to cause disagreement, as it was originally greeted by reviews which were either complete raves or totally damning. Gyron is set in a labyrinth which apparently contains all of Space and Time. At the heart of this maze is The Place Of Wisdom, where all the knowledge of an ancient scientist-scorcerer is hidden.

Your task is to enter the labyrinth in your craft, the Hedroid, and negotiate the maze to find that hidden knowledge. The pathways of the maze, which are drawn in 3D line graphics against a starry background, are guarded by Celestial Spheres — huge rolling spheres which wander the maze in patterns which repeat once ever fifteen billion years — and towers situated above the maze which can rotate to blast you as you approach.

The animation in the game is superb and the movement of the stars and spheres is performed with incredible precision which lends a real impression of size

Shadowfire from Beyond.





Melbourne House's Fighting Warrior.

and depth to the screen display. The problem is with the game itself. The maze is huge and finding the Place Of Wisdom is a task that probably could keep you occupied for fifteen billion years, if you felt like sticking with it.

When Gyron was first released some of the reviews raved aabout the quality of the animation and the sheer wonderfullness of the maths involved in the programming techniques but others pointed out that the game was really just a variation on the old 3D maze games that have been rattling about since home computers first appeared, and that wandering around a maze for a billion years was just plain boring regardless of how good the animation was.

Unfortunately I fell into the latter camp, and while I appreciated the sophistication of the programming I found the game a bit dull. Mind you, by buying Gyron as part of this compilation you're getting it at much less than the original price, so I'm inclined to feel more generous towards it now than I did to its first release.

Wisely saving the best 'till last, the last game on the second tape is **Shadowfire** — the innovative icon-driven adventure from Beyond. Set in the distant future Shadowfire puts you in command of the Enigma Team, a sort of futuristic 'A Team' made up of six beings from different worlds, and each with their own special talents.

The Enigma team's mission is to penetrate the space vessel Zoff V and rescue Ambassador Kryxix before the villainous General Zoff can get some secret plans from him. You have only one hour and forty minutes to complete this task.

The screen display is divided into two halves; the top half displays the status of all the main characters, a picture of the character that you are currently controlling, and a view screen which gives information about the location of all your characters and Zoff's forces aboard the space craft.

Below this is the area of screen which displays the icon menus for the Enigma team. Each member of the team has four associated screens: the status screen which control's that character's abilities — strength, speed, stamina and so on; the objects screen with icons for commands such as Drop, Hold and Activate which allows you to manipulate objects and finally the movement of the battle screens.

Despite the lack of conventional arcade action Shadowfire is an exciting and challenging game that looks just as advanced now as it did when first released. In addition, the Hotshots tape also includes the Shadowfire Tuner which allows you to alter the conditions of the game and the characters' abilities in order to make it either more or less difficult to complete, according to your own expertise with the game.

All together, the four games in this compilation would cost over £40 if bought separately, so the price of just under £10 represents very good value, assuming of course that you don't already have any of these titles. Although Hotshots doesn't have as many titles on it as other compilations the average standard of these four games is much higher than on just about any other collection that I can think of.

Most compilation tapes have one or two 'highlights' while the rest of the games are often just fillers, unremarkable games that just pad it out. The four titles on Hotshots though are all good quality, highly professional titles that wouldn't disgrace anybody's software collection.



BOUNCES



There are over one hundred prizes to be won in our great Bounces competition!

To mark the launch of their Spectrum game, Bounces, ZX and Beyond (the people who brought you Lord's of Midnight and Shadowfire) have gotten together to organise this splendiferous competition with more than a hundred prizes up for grabs.

Bounces

Bounces is a sporty sort of game in which two knights set to against each other in a sort of cross between jousting and pingpong. So, we thought we'd come up with a sporty sort of competition for all our dynamic, athletic readers (yes, that means you). We decided it was time to inflict one of the dreaded wordsquares on you, as it's been a while since we've had one in a competition. In this one there are the names of seven sporty activities, subtely hidden in amongst all the other random letters. The names of the sports can be either horizontal or vertical, backwards or forwards. Just mark them on the square and send the coupon in to ZX, by first post on 4th July 1986 and you're in with a chance of winning one of our magnificent prizes. Which, by the way are. . . .

The prizes

For the first prize winner there is £100 worth of sports equipment of his or her choice. Then for the runners up there are ten copies of Bounces itself, 50 Beyond T-Shirts and 100 Bounces posters (which bear a remarkable resemblance to the artwork on this very page).

The competition is open to all readers of ZX Computing Monthly, except employees of Argus Specialist Publications, Alabaster Passmore and Sons Ltd and Beyond Software. The winners will be announced in a future issue of ZX Computing Monthly, and the Editor's decision is final. No correspondence will be entered into with regard to the competition.

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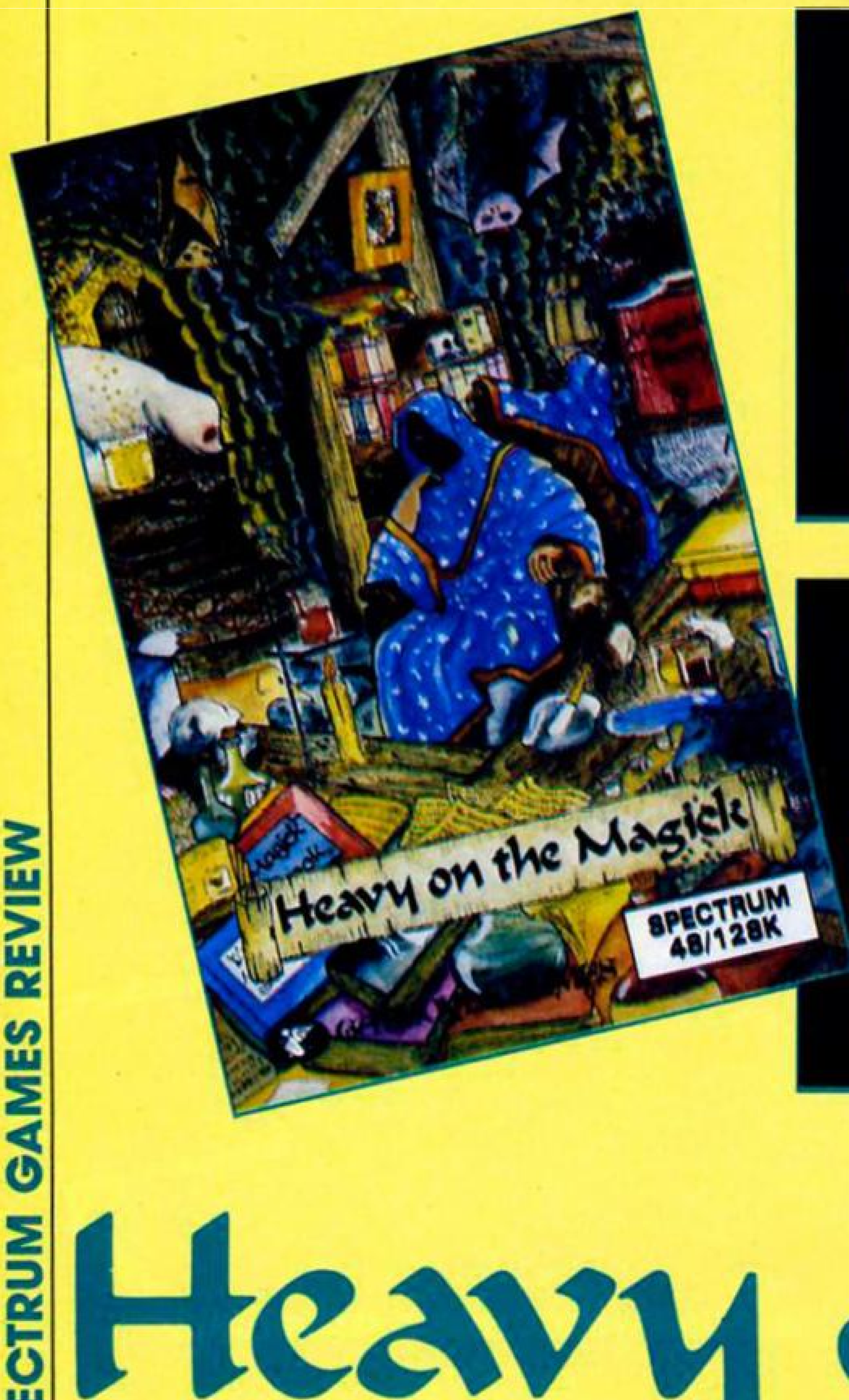
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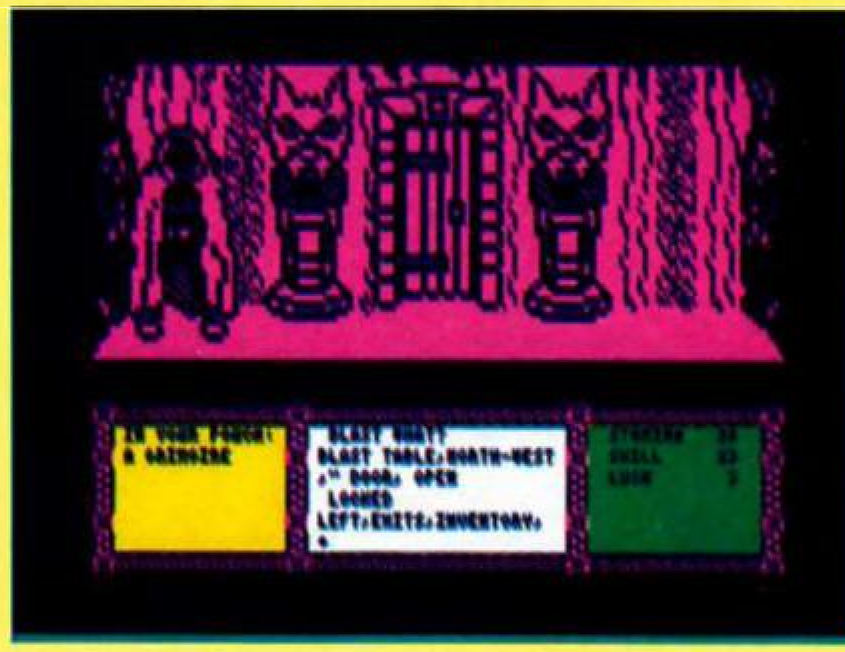
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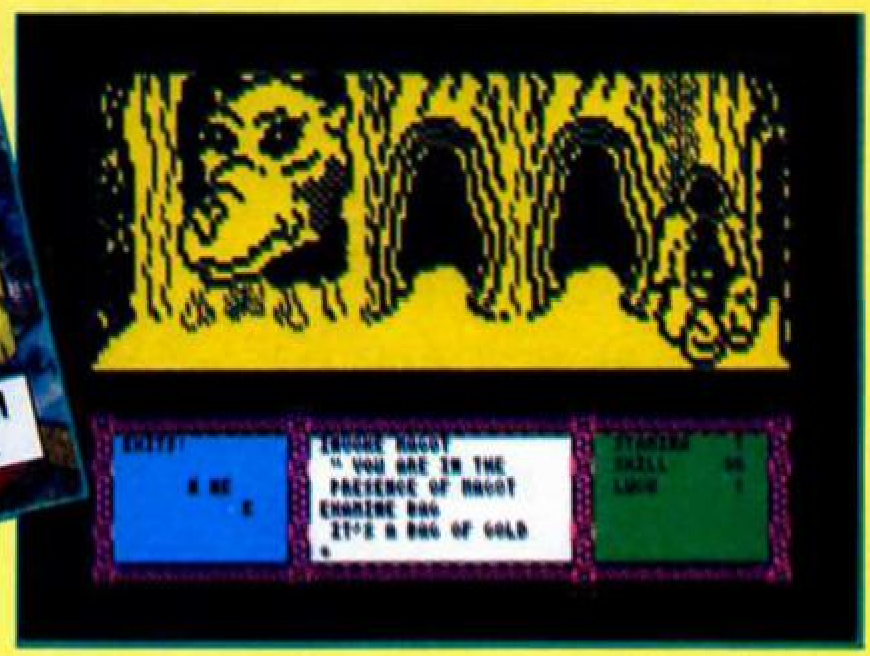
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Heavy on the Magick
SPECTRUM 48/128K


BLAST TABLE,NORTH-WEST
DOOR, OPEN
LOCKED
LEFT,EXITS,INVENTORY,


YOU ARE IN THE PRESENCE OF MAGOT
EXAMINE BAG
IT'S A BAG OF GOLD

Heavy on the

Magick

Gargoyle Games' latest fantasy epic is the best yet. Join ZX as we enter the dungeons of Icemark (but don't forget to bring your Grimoire).

Heavy On The Magick
Gargoyle Games
£9.95

You, Axil the Able, a fair to middling magician in the land of Icemark have made a *baaad* mistake. Sitting in your favourite tavern one night, you were telling ribald tales about Master Therion, who just happens to be one of the greatest Wizards not just of Icemark, but of all the lands of Graumerphy. He also happened to be sitting in a corner listening to every word.

Thirty seconds and one annoyed Wizard later you find yourself standing in a dark, dank dungeon beneath the castle known as Collodon's Pile. All alone, you look around at the dismal surroundings wondering why you didn't take your mother's advice and go into banking, until the sounds from just along the corridor make you realise that perhaps you're not alone after all...

Down in the dungeons

After their excursion into science fiction in Marsport, Gargoyle have returned to the lands of fantasy with Heavy On The Magick. In some ways, Magick, is similar to their earlier games Tir na Nog and Dun Darach, but is even more sophisticated than they were. As with all their recent games Magick features large animated characters and locations which occupy the top two thirds of the screen display. The lower section of the screen contains three windows giving information about your (Axil's) position in the dungeon depths, objects carried, and a display for the text commands that you enter to control Axil's actions.

Like a traditional adventure, Magick allows you to enter verbal commands in order to control your character, but instead of getting a text response you can see Axil and the other creatures on the screen move in response to your commands. The figures are a little less finely drawn than in previous Gargoyle games, but somehow the quality of the animation is even better. The movement is more realistic and the animation actually seems to add to the personality of Axil — for instance, if you tell him to move in a direction that is blocked he will begin to move, then turn to face you and shrug his shoulders as if to say "well what d'you want *me* to do about it?"

Your mission...

Axil's task is simply to get out of the dungeon alive, but as there are over 250 rooms and more than 20 different types of monster out to get you (including goblins, wyverns, and werewolves) it's a task that should keep you going for a long time.

Like all good dungeons this one also hides a number of magical items, locked doors and traps that can put paid to all but the canniest adventurers. Axil begins the game with three spells; Blast, Invoke, and Freeze.



Blast and Freeze are self explanatory and Invoke allows you to call up powerful beings who may or may not feel like helping you — it all depends on whether or not you've collected the correct Talismans to protect you. As you go along you may find further books of spells which will give you a better chance of surviving attacks by monsters.

Axil has three ability scores; stamina, skill and luck which afect the outcome of all his actions (attacking a monster when his stamina is low will result in a quick defeat, while a high luck score can save him from a sudden, ghastly death). These scores are determined at the start of the game, but experience gained from succesful (or unsuccesful) adventuring can boost or lower them, so keeping a close eye on these scores is vital to Axil's chances of getting out alive. Even using the 'save game' option affects your stamina, so you can't use it as an easy way of getting out of tough situations.

Commands are entered using a language called Merphish. This contains some 400 words and is as sophisticated as you're likely to find even in most text-only adventures, so although you are limited to relatively simple two-word commands there is still plenty of scope for giving instructions. All the usual pick up/drop/examine commands are available, as well as those for casting spells and travelling in all the directions of the compass, but it's up to you to experiment and find out the rest of the things that Axil can do.

Merphish also allows you to abbreviate commands so that just two words can be used to convey quite complex meanings. There is an ogre called Apex who is, fortunately, willing to help you and if, for instance, you need help opening a door you can just type, "Apex,door" and Apex will understand what you mean.

Magick strikes just the right balance between problem solving and monster bashing which should allow it to appeal to everyone, not just adventure purists or arcade addicts. The game is played in real-time, so when you suddenly find yourself being chased along a corridor by a werewolf you have to react quickly or you'll find yourself dying 'a horrible death'. All the monsters are very well drawn and animated, and the way that Axil casts spells is impressive, so that the graphics help a lot in creating the right sort of atmosphere for the game.

There have been many attempts to capture the spirit of fantasy games such as Dungeons and Dragons in a computer game, most of which have met with mixed results. For me, Heavy On The Magick is the first computer game that comes close to recreating the illusion of an exciting and challenging fantasy world, which is what D&D is all about. And Gargoyle plan to produce both Magick 'modules', which carry on from the end of this game and other completely new games also set in the lands of Graumerphy, so the adventures of Axil look like continuing for some time to come.

V
Ocean
£7.95

Those TV reptiles with a taste for rodents are out to conquer the earth.

Good grief! Just when we all thought we'd seen the last of V, the show that made Blake's 7 look like Hamlet, Ocean go and turn it into a computer game. The computerised V is nowhere near as hilarious as the original TV series, but despite the limitations of the Spectrum's graphics the animated character in the game is far less wooden than any of the actors in the series.

As in the original the hero of the piece is Donovan, who once more has to singlehandedly take on an entire race of lizard-creatures and prevent them from having their wicked way with our planet. This time around Donovan has managed to sneak his way aboard the aliens' Mother Ship and is attempting to destroy it by placing explosives at five key points on the ship — the Water Inlet, Air Pulication Plant, Nuclear Reactor, Central Computer and Docking Bay.

The Mother Ship is an enormous maze full of corridors arranged in five sections, and each section is made up of four floors which in turn are some eighteen screens wide. You can pass from one part of the ship to another by using the Beamer Pads and doorways which are scattered through the corridors, but because the ship is so large it might be a good idea to make a note of some of the more important locations as you come across them so that you can find them again if you need to.

The alien's leader, Diana, has discovered that Donovan is on board and has set loose hordes of security robots to track him down. These come in four types, but all deliver a nasty electric shock which can put a strain on Donovan's heart and eventually kill him. But to even the scales a little he is armed with a rechargeable laser and can do some nimble somersaulting over some of the robots to avoid coming into contact with them.

Graphically the game bears quite a resemblance to Impossible Mission, particularly in the leaping motion of the main character and the wandering robots. The upper two thirds of the screen show the interior of the ship, with an impressively detailed side view of the corridors on two levels. The remainder of the screen shows the energy level of Donovan's laser, the condition of his heart and oxygen levels.



The remainder of the screen provides information about the energy level of Donovan's laser, his heart beat and oxygen levels, as well as showing the display of Donovan's Communiputer. This is an icon driven device (again, similar to the one in Impossible Mission) which gives details of Donovan's location, the location of some of his main targets, and also enables him to try and break the security codes on the doors to these areas.

Six fingers

Unfortunately the instructions on the cassette inlay are so brief that they don't really give you any idea of how to use the Communiputer or even of how to find and use the explosives that you're going to need. I'm afraid that there's an awful lot in this game that the instructions just don't help you with at all, such as the code breaking sequences: these use a system of numbers and symbols based on the sumber six (as the aliens have six fingers on each hand, though logically that should give them a number system based on twelve, not six) which is obviously going to be quite tricky to work out, but the instructions don't even mention this aspect of the game, let alone give any idea of how to go about it.

V is a large and complex game, and just for once the game more than lives up to the original ideas that inspired it (mind you, the TV series wasn't a particularly hard act to follow, was it?). And as long as you're prepared to go through a lot of trial and error to find out all the things that the instructions don't bother to tell you about, then it should provide an enjoyable challenge that will take some time to solve.



GREAT





LIGHT SCREEN

Now that the machine code is complete, Toni Baker gives you the full details of how to use Light Screen Designer.



This article comprises an overall view of the Light Screen Designer program which has been serialised in ZX Computing. It is intended as (a) an overview, and (b) a guide as to how the program may be extended or improved by you, the user.

Getting started

The program should be SAVEd as CODE, occupying addresses DB00 to EA17. To load the program you should type **CLEAR 49151,** followed by **LOAD "LSD" CODE** (or equivalent microdrive or whatever version). A Basic program of your own may be loaded or typed in either before or after this. Once the program is in memory it may be activated either from a Basic program, or by the user as a direct command. The instruction needed to activate it is **RANDOMIZE USR 56789.** (The number 56789 was specially chosen so as to be easy to remember). Having done this the message 'Light Screen Designer' will appear at the bottom of the screen. You must now press the SPACE key once and you're away. (In this program, SPACE is used as an ESCAPE key — in this instance we are 'escaping' from the opening message).

Cursor movement

The program uses three cursors, two of which are on screen at all times. The cursors are printed as small crosswires, and each pixel of these crosswires is XORed with whatever is on the screen. This *means that* whenever two cursors fall directly on top of each other, both will become invisible. This may happen the first time you activate the program when two cursors will be initialised at the top left hand corner of the screen. Keys 5,6,7 and 8 are single-step cursor keys, and these will move the *main* cursor one pixel at a time in any direction, without altering the contents of the screen. If these keys are pressed together with CAPS SHIFT then continuous cursor movement is provided. On a Spectrum + or a Spectrum 128 the built-in cursor keys will also give continuous cursor movement.

Once you've practiced moving the MAIN cursor around the screen try pressing "A". At first, both cursors will appear to vanish, but if you play with the cursor controls a little more you'll see that what has happened is that the second cursor (the ORIGIN cursor, as we shall call it) has simply been moved to the position of the MAIN cursor. By this method you can move both the MAIN cursor and the ORIGIN cursor to any position on the screen.

Lines, rectangles and triangles

Try this: put a good distance between the two cursors and then press "W". You'll find a line should be drawn between the two points. Also, the cursors will appear to vanish because the ORIGIN cursor will have moved to the end of the line (on top of the MAIN cursor). This means that you can draw a continuous sequence of straight lines. Now — move the cursors apart again and press "J". You should find a rectangle drawn, with the two cursors at opposite corners. Now we shall learn to use the third cursor, called the MARKER cursor. Move the MAIN cursor anywhere you like and press "S" — a third cursor will have appeared at the main cursor position. Move the cursor again and press "A" to *move the ORIGIN cursor. Finally* move the cursor for the last time so that the three cursors form a triangle. Press "K", and a triangle should appear between the three points.

As you will have gathered from the above description, general operation of the program consists solely of moving cursors around the screen and pressing buttons, and each button has a different effect. At present there is no menu provided with the

DESIGNER



program, so it's best to provide yourself with a keyboard diagram such as that in FIGURE 1. If you own an old Spectrum (ie not a Spectrum + or a Spectrum 128) then you can actually cut holes in your diagram and lay it over the keyboard so that you can see at a glance what you're doing. Alternatively, if you wish to add a menu to the program, instructions to do so are included later in this article.

Users of the Spectrum + and Spectrum 128 should note that both symbol shift keys will operate the BRIGHT function, and that caps shift keys are not needed in the present version (except to produce capital letters when using text) since the built-in cursor keys make it unnecessary ever to use CAPS SHIFT 5,6,7 and 8.

The UNDO procedure

This is perhaps the most important of all the procedures. Located on key "0", the procedure will undo the last command performed — which means that if you make a mistake you can rub it out.

We've seen some of the controlling procedures already — cursor movement, along with MOVE and MARK ("A" and "S" respectively). There is a third controlling procedure on "D" — CANCEL MARK, which removes the marker cursor from the screen. STORE and RECALL ("3" and "4") may be used to store and recall the position of the MAIN cursor. Very simply, there are ten memories numbered zero to nine. To store the position of the main cursor in memory seven just press STORE ("3") and then "7". Similarly, to move the main cursor to the position stored in memory two press RECALL ("4") and then "2". It is also possible to temporarily store the whole screen! To do so press STORE ("3") and then ENTER. Conversely, to restore a stored screen press RECALL ("4") and then ENTER. Note that whilst a screen is stored in this manner UNDO will not work. To clear the screen memory you should press CLEAR MEM ("I") which will enable UNDO to work again as normal. Finally, one last controlling procedure is ESCAPE (SPACE). This procedure will ask you whether or not you wish to return to BASIC. You may then press "Y" (to return to BASIC), or "N" (to continue with Light Screen Designer). As always, you may alternatively press ESCAPE ("SPACE") which in this case has the same effect as "N".

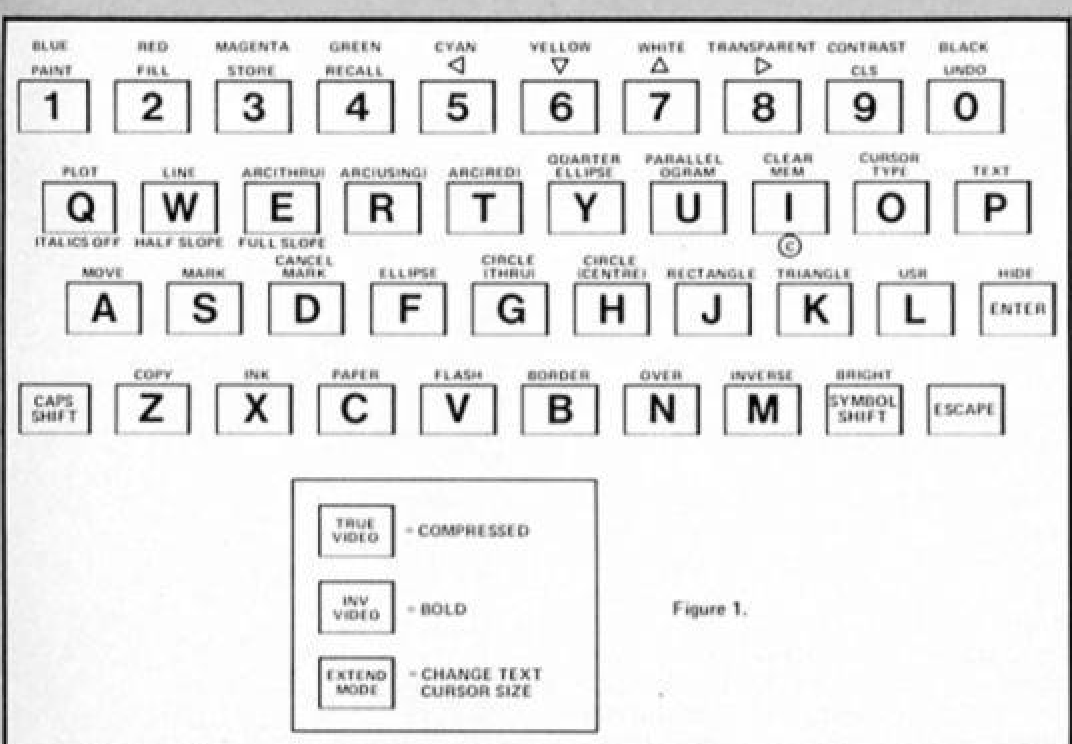


Figure 1.

CLS and colours

Light Screen Designer will always print things in the current ink colour, with the current paper colour as background. It has therefore been made very simple to change these colours. Simply press PAPER ("C") followed by "6" for PAPER YELLOW; INK ("X") followed by "9" for INK CONTRAST; OVER ("N") followed by "1" for OVER ON; BRIGHT ("Symbol Shift") followed by "8" for BRIGHT TRANSPARENT, and so on. CLS is on key "9". All of the colour controls except BRIGHT (INK/PAPER/FLASH/OVER/INVERSE) are in the same position that you would normally expect to find them on the Spectrum keyboard. BRIGHT is now on the Symbol Shift key, with BORDER taking its place on key "B". As always — if you *start* a procedure, and then decide you want to abandon it you can press ESCAPE which will return you to Light Screen Designer.

To copy a screen onto the ZX Printer you should press key "Z" (COPY). You will then be asked to press either "Y" or "N". Pressing "Y" will copy the screen as required — this is identical to the COPY routine in BASIC. At present there is no built-in facility for loading or saving screens, but this is nonetheless extremely simple to do. To save press ESCAPE followed by "Y" (to return to BASIC) then type SAVE "FILENAME" SCREEN$. If you then wish to continue drawing the screen you should type RANDOMIZE USR 56789. Similarly, to load, simply return to BASIC, use LOAD "FILENAME" SCREEN$ to load the picture in the normal way, and then use RANDOMIZE USR 56789 to continue Light Screen Designer.

Geometry

The geometry proceedures of Light Screen Designer are very good indeed. PLOT to plot a single point; LINE to draw a line; and TRIANGLE and RECTANGLE are self explanatory. There are three procedures for drawing an ARC — in each case an anti-



clockwise arc will be drawn from the ORIGIN cursor to the MAIN cursor. ARC (THROUGH) will draw an arch *through* the marker cursor (if this is possible), ARC (USING) will draw an arc *using* the marker cursor as the centre of the circle of which the arc forms a part (again if this is possible), and ARC (RAD) requires the user to imput the number of radians required for the arc. This latter variation is the closest to BASIC. PARALLELOGRAM will draw a parallelogram using three points given as three of the corners (the fourth corner will be worked out for you, positioned diagonally opposite the MARKER cursor). QUARTER ELLIPSE will draw a quarter ellipse anticlockwise from the ORIGIN cursor to the MAIN cursor — the two ends of such an ellipse will always slope horizontally and vertically. ELLIPSE will draw a complete ellipse at any angle. Simply position the ORIGIN cursor and the MAIN cursor at either end of the major axis, and the MARKER cursor somewhere along the intended curve. An ellipse will be drawn passing through all three points. Finally there are two procedures for drawing a circle: CIRCLE (THROUGH) will draw a circle passing through all three points, and CIRCLE (CENTRE) will draw a circle passing through the MAIN cursor, using the ORIGIN cursor as its centre.

Colouring in

PAINT and FILL are both designed for colouring in existing outlines. FILL is intended for black and white pictures (or at least simple ones) and will INK every pixel within the outline in the current ink colour. Pictures coloured in this way will copy perfectly well on the ZX Printer using COPY. PAINT is intended for more complicated colour pictures, and will intelligently decide for itself whether to PAPER or to INK any given pixel, so that two *adjacent* outlines may both be coloured in different colours. PAINT will *not* always use the current ink colour, but will ask you which colour you wish to use.

Miscellaneous

CURSOR TYPE (key "O") toggles the cursor image between small crosswires (this is most usual) and a small dot. HIDE ("ENTER") toggles which ever cursor you've chosen between visible and invisible. Finally USR (key "L") requires you to input a four digit hexadecimal address. A machine code subroutine at that address will be called. This last feature means of course that Light Screen Designer can be made to do anything whatsoever, and can integrate with other machine code programs.

Text

To type text on the screen from Light Screen Designer it is necessary to enter text mode, which is done by first of all moving the cursor to wherever is required, and then pressing key "P" (TEXT). Text does not have to be printed exactly on a character square, but may overlap as many squares as are required. The text may be printed in italics if desired. Once you are in text mode sym-shift-Q will switch italics off, symbol-shift-W will switch half-slope italics on, and symbol-shift-E will switch on full-slope italics.

Additional functions are available on the editing keys: TRUE VIDEO (or caps-shift-3) will toggle between seven and eight pixel wide characters; INV VIDEO (or caps-shift-4) will toggle between seven and eight pixel wide characters; INV VIDEO (or caps-shift-4) will toggle between bold type and ordinary type; GRAPH (or caps-shift-9) will enter or leave graphics mode, enabling you to enter graphic symbols or UDG's as text; EXTEND MODE (or both shifts together) will enable you to change the size of printed text — simply press EXTEND MODE (or both shifts together) followed by the cursor keys in any order, followed by ESCAPE ("SPACE"). BREAK (or caps-shift-space), or ENTER, will enable you to exit text mode. All of the symbols may be printed. Symbol-shift-I will produce the copyright symbol; if you own a Spectrum + or a Spectrum 128 then ";", ! and "" area available on separate keys; all remaining symbols may be obtained by holding down symbol-shift and pressing the key on (or under or over) which is printed the desired symbol. *It is never necessary to enter E-mode.* To leave text mode and return to Light Screen Designer proper you should press either BREAK or ENTER.

Extending and improving Light Screen Designer

The 'core' of the Light Screen Designer program is the main loop which occupies addresses DE17 to DE9D. This piece of program makes reference to a table called NULL_TABLE which occupies addresses DEAD to DEBD. Slotted neatly between these two is the ESCAPE routine (DE9E to DEAC). The present purpose of the NULL_TABLE is to list the key codes of those procedures for which it is *not* necessary to copy the screen into the back up screen area SCR2 (COOO to DAFF).

To extend the program an extensive reorganization of memory would be required. Very simply, the first three bytes of the main loop (at DE17) should be replaced by a single machine code JP instruction. The ESCAPE routine should be moved from DE9E down to DE1A. (To do this the ESCAPE entry in the command addresses table must be changed, so the two bytes DB82/DB83 must contain the new address of DE1A). Once you have done this the addresses between DE27 and DEBD will all be free, and you can then use them for whatever you like. New code should be added at the end of the program — addresses EA17 to FFFF are at present unused, so there's lots of room. The first new







LIGHT SCREEN DESIGNER FROM A MACHINE CODEIST'S POINT OF VIEW

The memory layout of Light Screen Designer is as follows:

CO00 to DAFF: SCR2	Back up copy of screen.
DB00 to DB03: ORIGIN_2	Back up copy of origin cursor position.
DB04 to DB07: MARKER_2	Back up copy of marker cursor position.
DB08 to DB0B: CURSOR_2	Back up copy of main cursor position.
DB0C to DB0F: ORIGIN	Origin cursor position.
DB10 to DB13: MARKER	Marker cursor position.
DB14 to DB17: CURSOR	Main cursor position.
DB18 to DB3F: MEMORY	Ten 4-byte memories capable of storing cursor position.
DB40 to DB41: J_FLAGS	Two bytes of flags.
DB42 to DB8F: CMD_ADDRS	Table of addresses for main procedures.
DB90 to DB9F: INP_TABLE	Table of acceptable inputs for use with message printing.
DBA0 to DCB4: MES_TABLE	Messages which may appear at bottom on screen.
DCB5 to DDD4:	Subroutines associated with cursor drawing and message printing.
DDD5 to DE16: START	Initialisation (Not 56789d=DDD5h).
DE17 to DE9D: MAIN_LOOP	Main structure of program.
DE9E to	Main procedures.

Any improvements or alterations made to Light Screen Designer will almost certainly involve changing the main loop at address DE17, so I will describe how to do this later on. First though, let's look at some of the individual subroutines which may be used with your own programs; either in conjunction with the Designer, or by taking out such subroutines and using them separately.

EOC9 — LINE_LENGTH:	Calculate the distance, L, from (M0,M1) to (M4,M5). Memories M0 to M3 are corrupted. Three additional entries are left on the calculator stack: in order: M1, M0, L.
E106 — MATRIX	Given p,q on calculator stack, solve the simultaneous equations M0*x+M1*y=p M2*x+M3*y=q On exit M4 will contain p, and M5 will contain q. The calculator stack will contain, in order: x, y. Note that if the equations are unsolvable then a triple-return will be performed.
E168 — INPUT_ITEM:	Will INPUT an item and leave that item on the calculator stack. The subroutine requres the existance of a "prompt" string which must end in "ENTER" (in fact with INPUT NUMBER and INPUT LINE the prompt string may consist of "ENTER" only, but with INPUT STRING it sould at least contain two quote marks followed by "ENTER"). On entry A must contain 20 (Input string), 60 (input number), or A0 (input line). C must contain the number of characters in the prompt string, B must contain the position within the prompt string of the flashing L or C cursor, and HL must point to the "ENTER" character at the end of the prompt.
E265 — ANGLE:	Calculates the angle, A, subtended at (M2,M3), by the line (M2,M3) to (M4,M5), and the horizontal (positive x axis). On exit A is left on the calculator stack.
E30D — T_CHR:	Wait till a key is pressed, then return all symbols without the necessity of enter E-mode.
E64A — CURVE:	Draw a curve — any curve whatsoever — on the screen. On entry BC must contain the number of line segments needed to draw this curve, and HL must contain the address of a subroutine which when called will leave the coordinates (X,Y) of the *next* point on the curve at the top of the calculator stack. Note that such a subroutine is likely to use the calculator memories, and that some of these may need to be initialised first.

piece of code should be a new version of the main loop — you can make this as close to the original as you like, or you can make it drastically different. One obvious improvement you can make is to implement a potential thirty-nine new procedures, all on CAPS-SHIFTed keys. You can initially make the new procedures the same as the old ones, simply by directing control to precisely the same addresses, and then change them as you add new procedures one at a time. A menu would be a good procedure to add — you could put it on CAPS SHFIT 1 (this is equivalent to the EDIT key on the Specrum + and Spectrum 128). Pressing ESCAPE would escape from the menu and take you back to Light Screen Designer proper (the original screen will have been preserved in SCR2), or pressing ENTER would continue the menu, giving the additional procedures available on shift.

The main loop itself could be drastically changed too. Potentially you could make the cursor move at variable speed (slow at first, then speeding up) — you could add a PENUP/PENDOWN feature so that the cursor draws as it moves — you could use the bottom two lines of the screen to display information about the exact coordinates of the three cursors at all times — and so on. The possibilities are endless.

Well, this brings me to the end of the series. Good programming everyone, and I hope this series has been informative. I'll be back with a new series soon. Bye till then, and may the force be with you.

QUAZAT

Hewson's new Droidathon sparks off the superlatives.

Quazatron
Hewson
£8.95



Your droid KLP-2 advancing through the multi-level terrain.



Looking over the potential prey: Facts from the Droid Data Library on an R6 Repair Robot.

One surefire test of a compulsive game is whether you are tempted to go back and play it while you are writing the review and I can assure you that I'm fighting like mad to resist it.

Quazatron is set in the multi-levelled city of the same name on the planet Quartech. You are in control of a Meknotech droid who must eliminate a whole horde of enemy droids who inhabit the underground complex.

There's nothing startling about the basic idea but the way it is developed and the number of additional features built into it make Quazatron a real joy to play.

There are eight levels to the city and almost as many levels of enjoyment. You can choose to treat the game as a straight shoot 'em up or try it as an exercise in strategy.

You can of course opt to laser every droid in sight but there is more than one way to skin a robot. Different classes of robot have varying strength levels and component parts — you can ram them, push them off ramps or engage in "grapple mode".

When grapple mode is engaged by putting the joystick into the central position and pressing fire you can move in on a vulnerable droid and dismantle him, saving for yourself weaponry, chassis and other elements you want to incorporate into your robot.

Each enemy droid has a defensive security circuit so that each time you go for grapple mode you are transferred to a sub-game. You are given a limited number of "pulsers" to fire at a central bar to turn it to your chosen colour. Not as simple as it sounds as you have a few seconds to decide which side of the bar you want to fire from. Once you've chosen, your target droid will be firing from the other side.

The game is complicated by junction boxes and obstacles that prevent you having a free shot at the bar. If you succeed in hitting at least seven of the 12 sections of the bar you are presented with a status report on your victim.

A careful choice is needed here as different elements are required to tackle the more sophisticated droids later in the game. If the grapple mode sub-game has been deadlocked requiring one or more re-matches the target droid may be severely damaged and have no elements that you can incorporate, so a swift first time victory is essential.

The droids are numbered from one to nine, the higher the number the easier it is to grapple successfully. The letters which are stamped on the droids refer to their function.

You can recharge your droid (KLP-2) from power points on the various levels. Your energy can be measured from the speed of rotation of the droid's cap. Every now and then a face emerges from under the cap to give you a smile or a frown depending on the state of the game. If you have a energy crisis the word 'power' will appear on the display at the bottom of the screen. If that happens it's time for a high speed visit to the nearest power point or, if possible, grapple a droid to steal a new power unit.

Although you start with a single life grappling successfully will gain you an extra life so it is advisable to come to grips with

RON



grappling early on.

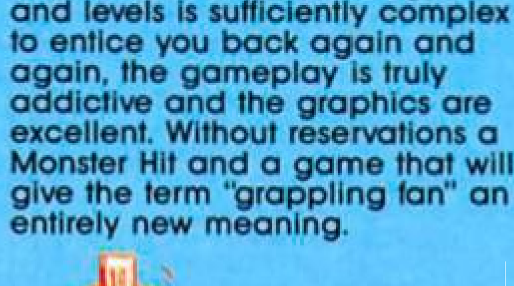
Scattered around the city are consoles which will give you valuable information. Once accessed you are presented with four icons giving a 3D map of the city, a side on view of the levels, information from the Droid Data Library and a return to game option.

The facts from the library wil give you the lowdown on droids which have a similar or lesser status to your own but it is useful to find out which have the vital elements to build your best droid.

Success in this game is all down to skilfull grappling, knowing which droid is beatable and what they have that can be cannibalised for your own robot. The best strategy is to go for droids which are close to your current class number.

As most of the droids movements are diagonal it can be tricky to master the steering at first but unlike a lot of games with a joystick option, keyboard control can be as easy and effective.

The scenario of the game, with its various ramps, ledges and levels is sufficiently complex to entice you back again and again, the gameplay is truly addictive and the graphics are excellent. Without reservations a Monster Hit and a game that will give the term "grappling fan" an entirely new meaning.



INTERVIEW



Steve Turner

After six months grappling with the code, programmer Steve Turner, author of Avalon, Dragontorc and Astroclone is finally getting hooked on his latest creation Quazatron.

"After finishing a game you just don't want to see the code again but after a while it seems fresh and now I'm trying to crack the game.

The way I program the game only materialises in the last month and up until the last few weeks before the game was complete I was still working with test graphics. It's always good to see the way it all comes together at the end.

I've heard a lot of people say that it takes about two months to produce a top notch game. For me because I do everything myself, from the graphics to the sound, it takes me six months to get a game just right."

Steve works in the same room as another Hewson programmer, Andrew Braybrook, whose game Paradroid for the C64 provided the inspiration for the gameplay in Quazatron.

"Obviously there is a good cross-over of ideas and designing of games is largely a joint effort.

With Quazatron I wanted to break away from the usual arcade or arcade/adventure type game. Paradroid is a clear influence but the graphics are inspired partly by Marble Madness and partly by Alien 8 with the use of multilayered graphics.

I wanted to build up a 3D scenario with different levels and create a huge tower but give it an unusual look by viewing it from a diagonal angle."

The music which features at the beginning of the game is surprisingly complex for the Spectrum considering its one channel limitation.

"Everyone knows that the sound on the Spectrum is woefully inadequate but I managed to develop some interrupt and sound routines which mean that you can get some variations in phase and frequency."

Steve has only a single quibble about Quazatron.

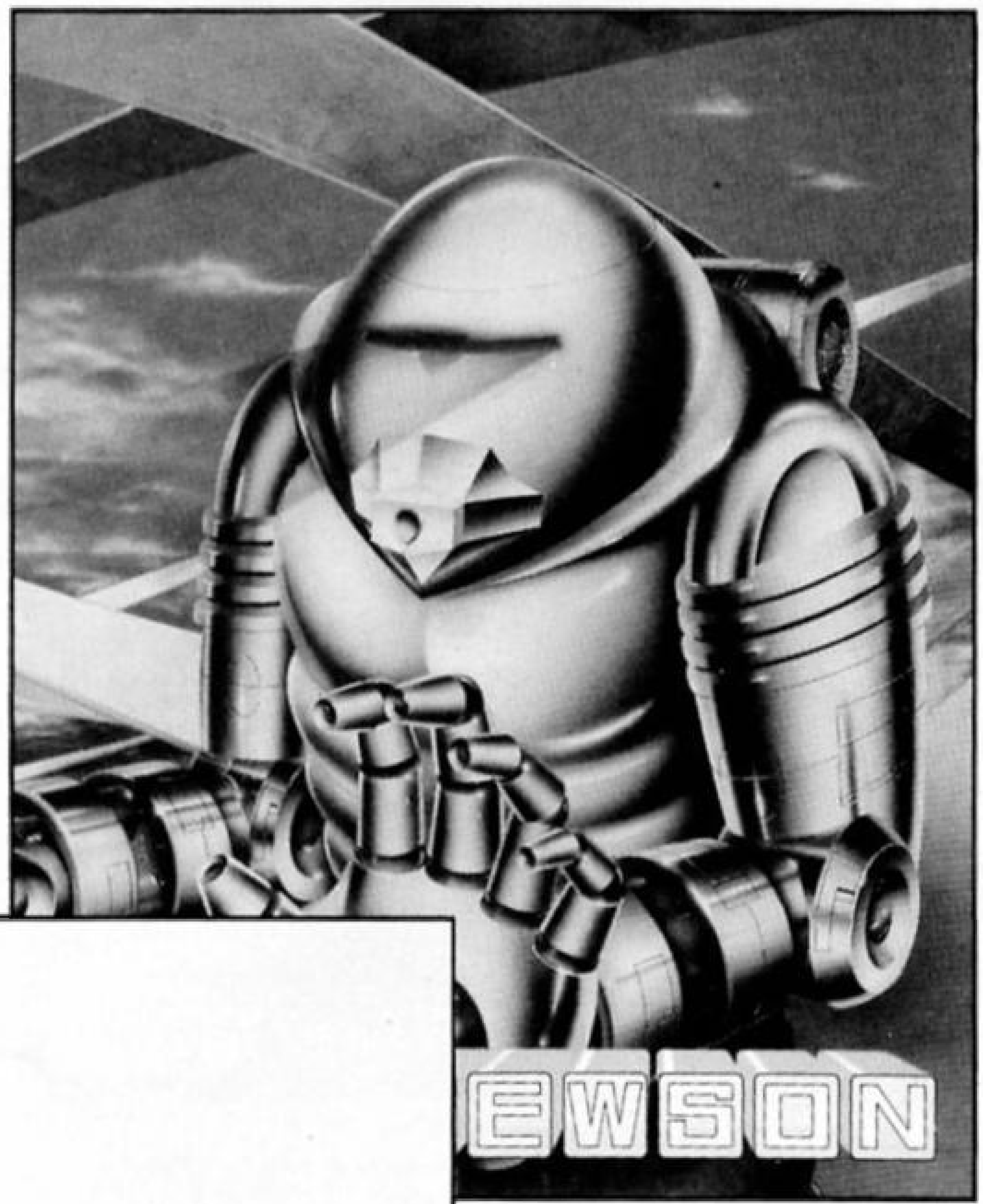
"There's just one thing about it I don't like and that's the lack of a scrolling capability but it's turned out okay in the end."

QUAZATRON

EXTRA

Quazatron's author Steve Turner gives ZX readers an insight into top flight programming with the Dictionary Look-Up Routine used in the game.

In a game you quickly run out of memory if a lot of text is included in the program. This routine allows a 254 word dictionary to be built up. Text can then be input to the program as data strings with one number per word. The machine code routine does a superfast look-up to enable fast decoding of the words. This technique was used in "Quazatron" to allow a large text data library with minimum space requirements.




```
5 CLEAR 63555
7 LET O=64000
10 REM "DICTIONARY LOADER"
20 INPUT A$
30 IF A$="" THEN GO TO 200
40 LET L=LEN A$
50 POKE O,L: LET O=O+1
60 FOR A=1 TO L
70 POKE O, CODE A$(A): LET O=O+1
80 NEXT A
90 GO TO 20
200 REM MACHINE CODE LOADER
210 DATA 62,0,33,0,250,6,0,24,3,78,35,9,61,32,250,77,68,201
215 LET P=65510
220 FOR A=0 TO 17
230 READ B
240 POKE P+A,B
250 NEXT A
260 REM EXAMPLE OF USE
270 DATA 1,2,3,4,5,255
280 READ A
290 IF A=255 THEN GO TO 500
300 POKE P+1, A
305 LET A$=""
306 LET W=USR P
307 LET L=PEEK W: LET W=W+1
308 FOR A=1 TO L
309 LET A$=A$+CHR$ PEEK W
310 LET W=W+1
320 NEXT A
330 PRINT A$;"";
340 GO TO 280
```

```
        ;DICTIONARY LOOKUP
        ORG  65510
        LD   A,0 ;WORD NO POKED
        LD   HL,64000
        LD   B,0
        JR   LOOK
NEXT    LD   C,(HL)
        INC  HL
        ADD  HL,BC
LOOK    DEC  A
        JR   NZ,NEXT
        LD   B,H
        LD   C,L
        RET
```

Notes

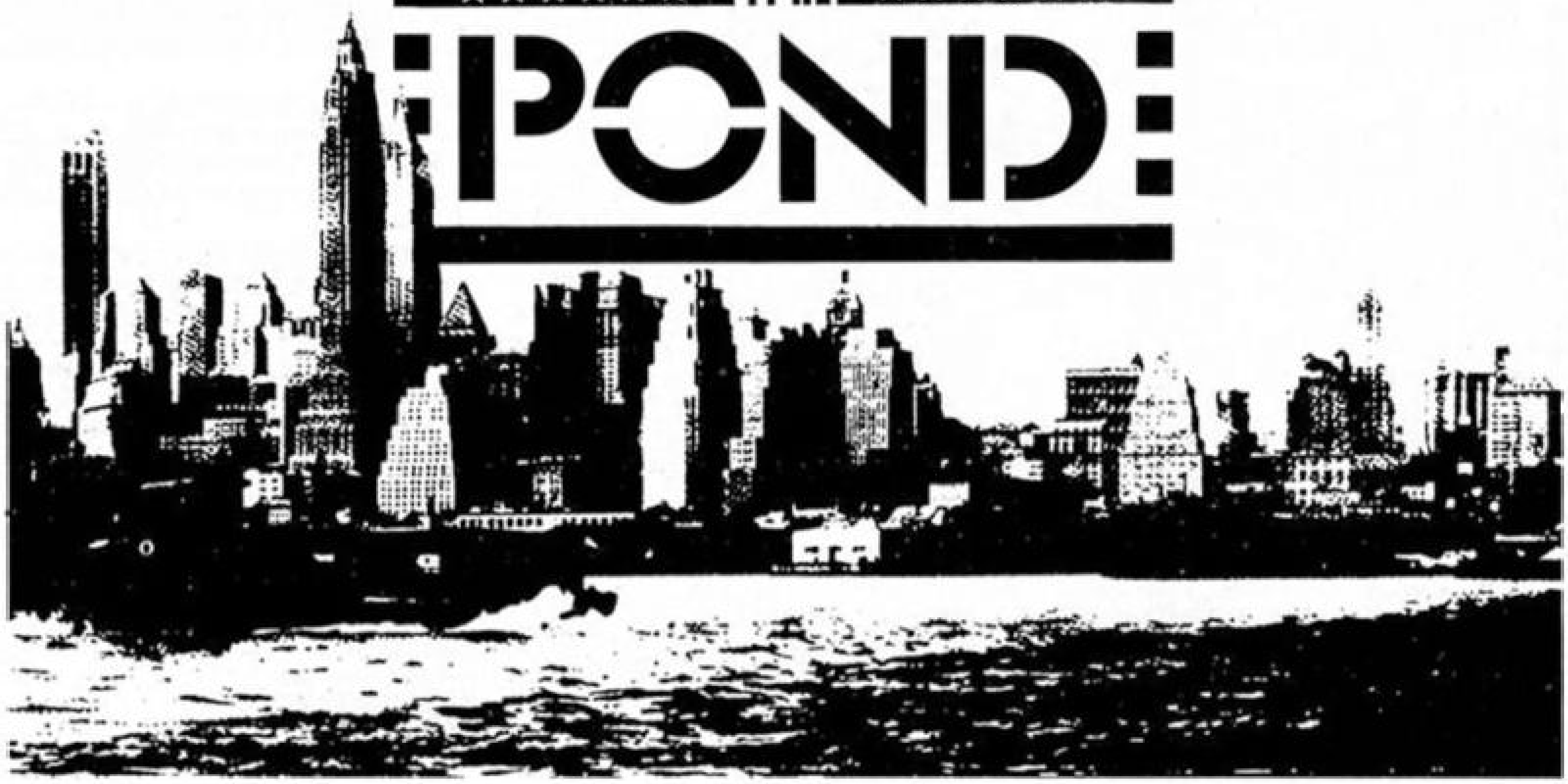
This can be used to input a dictionary to save space in any text game.

Lines 7 - 90 allow input of the word list. Try "THIS", "IS", "A", "LOOKUP".

Lines 200 - 250 load the machine code routine.

Lines 270 - 340 gives an example of the use printing the first five words.

ACROSS THE POND



To coincide with our Micronet feature, Mark Fendrick looks at Sinclair networks in the States.

One of the things that has united the American Sinclair community has been the availablity of on-line communications. Even in the days of the Timex/Sinclair 1000 (ZX81), one of the more popular peripherals was the modem — most notably the Byte-Back modem/interface/software combination. When the U.S. version of the Spectrum (T/S 2068) was released, the available hardware choices increased by 100%. Not only did Byte-Back upgrade its telecommunications package, but Westridge Communications released the modem which it had made for Timex before they withdrew from the market.

With the advent of the Westridge TS 2050 modem (and later MTERM 'smart' telecommunications software), the Sinclair on-line community was formed. Although the actual number of Sinclair users probably represents a small percentage of all Sinclair computerists, those who are part of this society represent a focal point from which information flows to the rest of the North American Sinclair owners.

Zebra

There are a number of different ways in which you can contact other sinclair computerists via modem, starting with local (or usually not so local) Bulletin Boards (BBSs). The first, and still most popular of these is run by Zebra Systems, a long-time Sinclair dealer/developer. The Zebra BBS ((718) 296-2229) came on-line shortly after the release of the TS 2050 modem, and swiftly grew into the first Sinclair-only BBS. Sinclair owners from all across the country started calling this New York City based board, and information flowed. With the lack of coverage from the majority of the U.S. press, this was the best source of information as to happenings and new products.

In other areas of the country, where nobody was starting Sinclair-only BBSs, some local system operators (SYSOPS) have set up sub-boards which gave area Sinclair owners a place to get together and share information. These BBSs are ideal insofar as they have no on-line charges, and only the telephone charges have to be paid. The drawback, however, is that unless you want to pay long distance charges, you are confined to a small geographic area from which to swap information. Luckily, there are national services available via a local telephone call. The two most popular are THE SOURCE and CompuServe. Based in Virginia and Ohio respectively, they can be accessed through local 'nodes' which generally represent only a local call. Occasionally I will even come across a member from Europe who has connected through their packet switching system (PSS). CompuServe has a Sinclair forum with sub-sections for both the Timex/Sinclair micros and the QL. On Wednesday nights, thanks to multi-user conferencing capabilities, Sinclair owners and dealers get together for a live on-line conference. From this forum and conference setup, information makes its way to the local BBSs and users groups. That is how the North American Sinclair community survives.

I can be reached on either the Zebra BBS, or on THE SOURCE (BCA632) or CompuServe (74216,1245).

Colour boards

Ironically, what makes Prestel and Micronet so popular in the U.K., has been the downfall of a number of commercial on-line companies in the U.S. — color and graphics. The NY Times reported that in March of this year, the Viewtron and Gateway videotex services ceased operations. The generally accepted reason is that they

tried to offer a color and graphics service, unlike the more successful text-only services. The hardware required to provide the color and graphics was very expensive, and caused the subscription to these services to be quite high. (Non-prime time connect charges on THE SOURCE are about $7.75 an hour, while on CompuServe they are $5.95/hour.) In the U.S. it seems that success depends on a text-only system.

With the introduction of the QL to the American market, once again new owners started looking for an acceptable modem/interface/software combination. The first successful product is one from Miracle Systems, and is available in the U.S. from Curry Computer (P.O. Box 5607; Glendale, AZ 85312-5607; (602) 978-2902) for $49.00. This set comes with a hardware adaptor which attaches to the ser2 port on the QL, and has a standard db25 RS232C connector on the other end, which attaches to the modem of your choice. (You supply the modem. I have my QL attached to a TRS-80 Modem I B.) Along this connecting wire is a small box with two switches. The left hand switch controls the receiving rate — either 300 or 1200 baud. The right hand switch controls the rate of transmission — either 75 baud or 300/1200 baud. This is the first clue that this is not American designed hardware, as the 75 baud rate is unknown and unused here in the U.S. The 75/1200 or 1200/75 baud rates that are necessary due to the configuration of the BT system, is not necessary in North America. This adaptor is necessary in the first place due to the way that Sinclair designed the QL. To save cost, a non-standard chip setup was used to control the RS232 port along with other functions. This causes time lags where incoming information has a tendency to get lost. Also, the QL is set for two stop bits, not the usual U.S. configuration. The Miracle Systems MODAPTER takes care of all that.

The software currently being supplied with the MODAPTER is version 4.0 of QCODE. This is quite a nice piece of software, and adds many of the features I lacked with MTERM on my T/S 2068. It is quite simple to learn, and has help files to provide assistance to the user if necessary.

When first LOADed, you are prompted to press F3, which brings you the directory. The original copy which comes with the MODAPTOR has the numbers and parameters already entered for PRESTEL, MICRONET and what appear to be a few directory entries. You will be able to enter the name, telephone number, parameters and log-on procedures for each computer you will be calling. You have two pages on which to enter your numbers, which should be plenty of room. Once these are entered you will be instructed to SAVE these entries onto the back-up cartridge which you (of course) made as soon as you received your software. It will be necessary to indicate if the service is teletype or viewdata type, but as I explained earlier, in the U.S. you will use the teletype mode practically 100% of the time.

Other settings which you will be required to enter include parity, stop bits and baud rate. All baud rates including 75/1200, 300/300 and 1200/1200 are available. That means that unless you are using a 2400 baud modem (highly unlikely) you can use any modem which can be connected to the MODAPTOR.

Log on

Two of the most useful features are the LOG (download) and TRANSMIT (upload) functions. To download what is being received, you select TRANSMIT, and are given the default file name of MDV2_LOG_LIS, which you may accept or change. (If a file of the same name is already on cartridge, you will be given the opportunity of overwriting it, or aborting the download.) These files may be imported to Quill, or used by the QCODE text editor, QED. This is a simple line type text editor which you can use to prepare text off-line. Any files that are downloaded can be read into QED and edited therin. You can also LOAD _LIS files from Quill into QED. Downloaded files (text or program) may also be imported into Quill for editing. In addition to text files, I have successfully downloaded programs which ran without any corrections.

You can also tranmit just about anything using QCODE, by selecting the TRANSMIT option. The default for this is MDV1_DEMO_LIS which had me totally fascinated. The file is a download of some on-line time on PRESTEL, MICRONET and GNOME AT HOME. By transmitting in LOCAL mode, you can see offscreen what is in file without actually transmitting it to a remote computer. I saw color graphics and game screens as I had never seen from anything in this country. As you would imagine by my earlier description of the lack of color and graphics on U.S. databases, I was impressed. (Why can this work in the U.K. but cause companies to go out of business in the U.S.?)

You can change the default filename to show the actual file you want to sent. When using Quill files, you should PRINT the document to a microdrive cartridge, and TRANSMIT the resulting _LIS file. This column is sent to ZX COMPUTING in just that manner. The column is written on Quill, PRINTed to a _LIS file, and then TRANSMITted to Europe via MCI Mail. I have found that occasionally when TRANSMITTING a file, spurious characters appear on my screen, but I have found that they are not being sent, and my file arrives intact. This TRANSMIT facility may also be used to send SuperBASIC programs, and I am going to experiment on sending machine language files as well.

There are some features, such as SAVEing viewdata screens, that don't just relate to the North American market, but it is a good terminal emulation program. Unfortunately, it is also the only fully viable package currently available in the U.S. which can accommodate the American protocols.

I have contacted Tandata Marketing, who produce a modem package for the QL in the U.K. (see review in the October/November 1985 issue of ZXC) to inquire about the possible availability of the Q-Comm package in the U.S. I was referred to U.S. Telecom — a major company here — who handles all of Tandata's North American marketing. Although they are not importing the Q-Comm package (yet?), Mr. Robert Berger informed me that they would review the market for QL's and would make a decision as to the feasibility of bringing the line to market. I would certainly like to see that decision made in our favour.

Softsync

Just to point out that it is indeed a small world, I received a press release from Softsync (a major U.S. software publisher who started out as the first U.S. distributor of software for the ZX-80) touting their new IBM line. The release was sent out by their new director of IBM marketing — Nigel Searle, late of Sinclair Research Ltd! The irony of this is that Softsync is the first publisher who licensed my softare, and I credit Softsync president, Sue Currier, for my education in Sinclair programming. Everytime I submitted my revised software for marketing, Sue would say "That's great, but I want it to do. . ." I informed her that it couldn't be done on the ZX-81 with 16K, but proceeded to find a way to accomplish what she required. I learned more about programming in this manner than all of the books I had ever read. I wish Mr. Searle all the best with his new venture.

Malcolm Sargent offers a few ideas on how to speed up your programs without resorting to machine code.

Basic on the Spectrum is very slow and to write faster programs you must revert to machine code or a compiler. However with the following routines you should be able to speed up your programs without getting bogged down in m/c. All routines should work on all versions of the Spectrum.

Interrupts

The Spectrum interrupts every two milli-seconds to do a number of semi-essential operations which include error checking and checking if the break key is pressed. We can disable the interrupts by three machine code instructions 'XOR A', 'OUT (255),A' and 'DI' (followed by a 'RET' to return to Basic). This can be used in Basic by the following line at the beginning of the program:

```
10 CLEAR 64999:POKE 65000,175:POKE 65001,211:POKE 65002,255:POKE 65003,243:POKE 65004,201:RAND USR 65000
```

After interrupts have been disabled Basic will run a little faster and any error will cause the machine to crash (pull the plug). At eh end of the program there must be a line to enable the interrupts or the computer crashes and to stop this use the line below as the last one executed in your program.

```
9999 POKE 65000,251:POKE 65001,210:RAND USR 65000
```

Due to the way Basic is written, as the program increase in size the slower it runs. However if we use less memory the program will run faster and you can use the following ideas to keep the program short.

1. Have all subroutines at the beginning of your program as the Basic has less lines to look through to find your line.
2. Initialise all variables at the end of your program and use VAL and CODE when defining variables as this saves memory.
3. Use multi-statement lines a they save a lot of memory and run faster. Do not use REM statements in these multi-statement lines.
4. Have very few, if any REM statements.
5. When running a program and Basic comes to a GOTO (line no.) Basic looks through every memory position until it comes to one the same or the nearest after it. Then it alters the system variable 'NXTLN' to the address of the line number and executes it. However to save the computer carrying out this very time consuming process you can poke the system variable to the address and do away with the GOTO statement. Use the following program to work out the line number's address and replace the GOTO with **POKE 23637,(LO BYTE):POKE 23638,(HI BYTE)**. When altering lines remember to refind the address of every line after the altered line.

```
9998 INPUT "LINE NUMBER-";LN: LET A=41472-(65535-USR 7962):LET B =(PEEK 23635*256)+PEEK 23635: FOR S=B TO (A+B+100):IF (PEEK S*256)+ PEEK (S+1)= LN AND PEEK (S-1)=13 OR (PEEK S*256) +PEEK (S+1)=LN AND PEEK (S-1)=128 THEN LET HI=INT (S/256):LET LO = S-(HI*256):PRINT "LINE NUMBER:- ";LN;"          ADDRESS:-";S;"HI BYTE --";HI;"LO BYTE --";LO:STOP
9999 NEXT S:PRINT"NOT FOUND"
```

6. A fast way to get the value of a key being pressed is to PEEK the value out of the system variable 'LAST K' (23560). The statement to read the keyboard into a$ is **1000 LET A$=CHR$(PEEK 23560):POKE 23560,0.**
7. To test if you have found any new ways to make your programs run faster try this routine

10 POKE 23672,0:POKE 23673,0: POKE 23674,0 (then RUN the program).
99 PRINT "TIME PASTED IN 1/50 SECONDS IS"; PEEK 23672+256*PEEK 23673+65535*PEEK 23674

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micronet

In the past year the number of Spectrum users on Micronet has rocketed to 7,000 and they now account for 35% of the networks' users. ZX takes a look at what Micronet has to offer.



Scheme and plot for the Emperor's throne.

When Micronet began operating in 1983 it was distinctly small scale; two men and a Spectrum to be precise. Now it has grown into a communications network with 20,000 members roaming over a system occupying over 40,000 screens.

Micronet offers an almost bewildering range of services from news and information to chatlines and multi-user games.

As the price of modems continues to fall communications are coming within the price range of more and more users and as Micronet's publisher Simon Darcy explained the network is changing with the new influx.

"In the beginning Micronet appealed strictly to the hard core computer user but now people are joining because it's entertaining and informative. It is attractive to those who want to find a new use for their computer."

Within a single article it would be impossible to cover the full extent of the network so I'll focus on just a few areas.

The Spectrum User Base

This is an area set aside specifically for Spectrum users and of particular interest is the Spectrum User To User Group which now has over 700 members. A local directory will enable you to contact Spectrum users in your area. The microbase has its own editor and items appear regularly to help users get the best out of their equipment and bring them up to date with the latest available hardware.



Chatline front page.

Chatlines

If you want instant advice on technical matters or want to express an opinion there are numerous chatlines open 24 hours a day. The chatlines are accessed a phenomenal 3,500,000 times a month.

There are seven Quick chat lines, two on general topics, Gayline, and others covering politics, religion, music and adventure problems. There is no archiving, so blink and you'll miss the messages, which are free to send.

Daisy chatlines are a series of messages that can be archived back to read the previous 100 missives. To send a message via the daisy chatline presently costs 2p.

A new chatline has just been set up called Turbochat which will show up to four messages simultaneously on screen to make following the continuous conversation that much easier. Messages that senders wish to be confidential can always be sent via Prestel Mailboxes.

Simon Darcy commented: "The real value of the chatline is that it means nobody need ever be bored or confused by a technical problem. It can also save you making financial mistakes. If, say, you weren't quite sure which printer to buy you can put up a message day or night and invariably find someone who has already encountered the problem and can advise you."

Celebrity Chatline

Each month several celebrities go onto Micronet for a spot of instant interaction, answering questions and receiving messages from members. Recent guests have included Paul Daniels, Selina Scott, Peter Powell, Patrick Moore and Colin Baker.

Sometimes the two hour session is extended far into the night and access figures of 100,000 over a month for Celebrity Chatline are not uncommon.

Micronet's Peter Provert said, "It's this sort of interaction that

makes Micronet special. Where else could someone sit down in front of a Spectrum and ask Colin Baker what it is really like to be Dr Who? If every home was on line you could get an instant response from people like your bank manager or local MP."

Starnet

Described as a game of "Galactic Proportions" Starnet was the first multi user game and now has 600 adventurers hurtling round a galaxy of 3000 stars in search of wealth and power. To the uninitiated the game is unintelligible and that's just how the initiated like it. The need to create secret alliances has flooded the Starnet Chatline with coded messages and unfathomable jargon.

As a highly complex game of diplomacy in space Starnet has



A Halloween warning.



Start your own mag.

proved to be a great success since it was introduced in December 85 and there is always a waiting list to join.

The Emperor at the moment is in real life a middle aged doctor who ousted the former ruler by building an alliance of 50 members using Prestel Mailboxes to signal his plans. When the moment was right they took power and the first move of the new potentate was to declare a national holiday so that nobody could move in the galaxy for 24 hours. Now the Emperor spends most of his time issuing decrees — his days may be numbered.

The Gallery

The opportunity is always there to create your own magazine. You are allocated three frames to fill as you like and in time if the feature proves popular it can continue to grow. The ever expanding reviews section on Micronet started out from the gallery area.

"The gallery enables people to do what they choose and with Micronet the whole process of publishing and distribution is all in one," said Simon Darcy.

Telesoftware

If you fancy playing a new game at 3 o'clock in the morning there is a 24 hour telesoftware service which allows you to download free programs for the Spectrum. A wide variety of utility, education, business and games software is available and in addition the latest chart games can be downloaded at a cost around 20% below the High Street price.

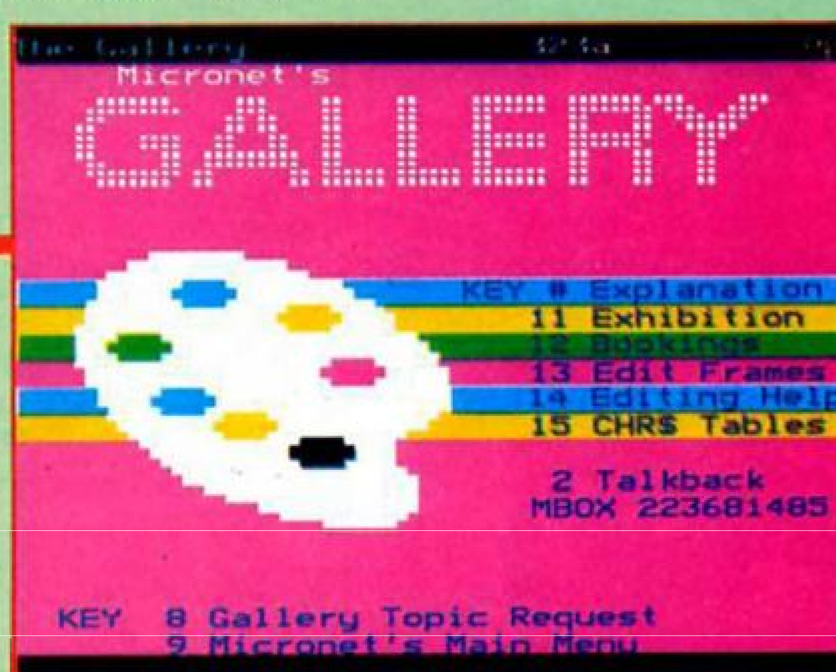
The Future

Plans are afoot to make Prestel multi baud rate giving owners of a wider selection of modems the means to log on.

Accessing areas of Micronet should be easier soon. At present finding your way around relies on typing in page numbers but a keyword search system will cut down access time and is expected to be introduced shortly.

Micronet are also looking at the possibility of buying up the copyright of classic computer games that could be downloaded free of charge.

And further good news for members is that frame charges may be dropped. Simon Darcy said, "At present the cost of being on Micronet once you have your subscription is your telephone bill plus the 1p or 2p charges we make for accessing certain frames. Now that our membership has grown so much we will be in a position to break even from the subscriptions so that frame charges can be scrubbed."



From Micronet's Gallery.


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CROSSWIRES

Our technical wizard Ray Elder unravels your Sinclair computing problems

Back-ups

Dear Sir,

Q *I purchased the Microdrive Expansion System on the understanding that I could transfer my son's cassette games onto cartridges. I cannot find the correct method of doing this and wondered if you could help.*

This would be for my son's personal use only I assure you. In fact the purchase of the microdrive was made mainly to speed up the loading of games. This in turn, I hoped would encourage him in the greater use of his computer.
Yours sincerely,
G. D. Barrell
Surrey.

A This is a common problem and many of us have been caught by it. Unless you are an experienced hacker with plenty of time — I have spent days on a single program! — you are unlucky. The problem is that there are many ways of protecting a program, none foolproof, and each company uses different combinations of them to safeguard their program.

Personally I would recommend the MIRAGE MICRODRIVER from Mirage Microcomputers Ltd., 24 Bank St., Braintree, Essex, CM7 7UL which will make back up copies of most of the programs on the market and plugs into the Spectrum's peripherhals port.

There are two disadvantages.
1. It will set you back a further £39.95 and
2. A few companies have devised protection against it!
However you will need this or a similar unit to get the most from your microdrive.

Tasprint

Dear Sir,

Q *Almost a year ago I bought a copy of TASPRINT. Off and on I tried to make it work but without any luck.*

The configuration I use is as follows: ZX Spectrum+, Interface 1, Euroelectronics ZX Lprint 3, Centronics GLP (similar to Brother M1009). This printer has only the parallel interface connector. Since this printer is not mentioned in the last list I have to press O which is then followed by six questions. I wonder if you could send me the right control code sequence for the first three questions and the right answers for the last three questions.
E. Jongema
Holland.

A So, I linked up the GLP II which had just arrived for review and tried our copy of TASPRINT...

First of all the printers are essentially the same and both operate on Epsom FX80 compatibility, so I ran Tasprint and entered 'A' for FX80 and it worked! So I would suggest that you do this rather than use option O. You will have to use the 48 characters per line function as the printers only use 480 bits per line (check your manual to confirm). If you want to go through the whole sequence then I used the following codes and they also worked, entered one at a time.

Question: (e=ENTER key)
1. 27 e 50 e e
2. 27 e 51 e 24 e e
3. 27 e 75 e 224 e 1 e e
4. 48 e
5. B e
6. 8 e

Finally to make it work, NEW the computer and enter this test program.

```
10 RANDOMIZE USR 62000
20 LPRINT " "
30 FOR I=136 TO 139
40 LPRINT CHR$(I);"TESTING 1 2 3 4"
50 NEXT I
60 LPRINT CHR$(143)"END OF TEST"
```

Tasword

Dear Sir,

Q *I am writing about the article which you published that allowed a word count to be added to Tasword 2. I already have one added to the program, but would like to just add the Header routine if it is possible. Please could you tell me how to do this.*
Mr. Vivian D. Hankey
Staffs.

A Certainly!
You will need to include this option in your menu and modify/add line **670 IF b=VAL "104" THEN GO TO VAL "9000"** and include the lines 9000 to 9040 as published.

Temporarily add lines 9820 and 9840, type **GO TO 9840** and after it has run change line 710 to the version published, amending to suit any other changes previously made in your version. RUN the program and use the SAVE TASWORD option to make a backup copy for future use.

I/Fs and things

Dear Sir,

Q *I have a few problems which I would like your advice on:*
1. Can you suggest a joystick interface which will work on all games, my Kempston one does not control many programs.
2. I have run out of ZX Printer paper, can you let me know of anyone still supplying it?
3. I am thinking of adding a fast access system and a better printer, could you comment on Wafadrive, ZX Microdrive, Brother HR5 and M1009 printers. Also which I/F would you suggest for a direct connection to a printer.
4. Which arcade style games program writer would you recommend so I can start to write my own shoot 'em up games.
J. Narayan Kumar
India.

A OK. Here goes...
First joysticks, try the TURBO from RAM Electronics, Unit 8, Redfields Industrial Park, Redfield Lane, Church Crookham, Aldershot, Hants. GU13 0RE which supports Kempston, Protek and Sinclair protocols and costs £18.50 (plus £3.00 p&p).

Second, I am afraid that all the suppliers, including Print and Plot Products, no longer stock ZX printer paper, there may be some company out there with a few rolls left, if they let us know we'll pass their address on you you! *(Ah! rush back to the news page and check the item on Dean Electronics — Ed.)*

Personally I have had many problems with the Microdrives, but I know of people who have had trouble free operation as well. The Wafadrive has performed reliably for me and is very cheap at the moment. Best of all is the OPUS disk drive unit which has been reduced to £149.95 and includes a CENTRONICS printer port and a joystick port (but limited). An excellent unit.

Both printers are reliable and popular and work well with the Spectrum, although make a decision on RS232 or Centronics and go for the best printer to suit. As for an independent printer interface, ZX Lprint 3 from Euroelectronics is great and features BOTH RS232 and Centronics and costs £39.95 from them at 26 Clarence Square, Cheltenham, Glos., GL50 2UJ. (plus p&p).

And finally, for an easy to use, fun games package try H.U. R.G. from Melbourne House, however it is a bit limited and to go to the other extreme there is WHITE LIGHTNING from Oasis. This is a complex but incredibly versatile games writing package for expert programmers.

'81 modem

Dear Sir,

Q *HELP! I do not want to abandon my ZX81 but I am desperate for information on companies marketing a Disk Drive and a Modem for it. Do you of any?*
Timothy Parnell.

A Unfortunately communications wasn't as popular a passtime during the '81's heyday as it is now, so there was never much demand for modems for it. And, as it was such an unsophisticated machine in the early days of home computing, luxuries like disc drives weren't considered essential. However, the Sinclair community in America is much more keen on '81 related peripherals so perhaps Mark Fendrick's US. news column might offer you some hope.

A BEGINNER'S GUIDE TO PRINTERS

Buying your first printer can be a big step, especially if you're confused by all the jargon. Ray Elder offers some advice on the options available.

Recently we featured a set of articles on printers and the enquiries came thick and fast. Even though we tried to cover them fairly basically, we still seemed to have confused the beginner.

"It's no good," said the Ed., "we've got to get a really simple approach". And that's how I got the job!

Where to start?

There are a great many printers on the market suitable for the Spectrum and QL and really the deciding factor in choosing must be what you want it for! It's pointless spending hundreds of pounds on a printer which will only be used to produce listings for your own personal use, and conversely spending less than £100 for a printer which will be expected to produce quality manuscripts is money down the drain.

Added to this is the connection to the computer, an interface may be required and this can cause a lot of confusion.

There are a few printers which are designed specifically to work with the ZX81 and the Spectrum. You may find an old ZX Printer lurking at the back of your local computer shop, but these are noisy, unreliable and obsolete. They may be very cheap but are best left alone.

The Alphacom 32 is very reliable and produces acceptable print using heat sensitive paper. I use it with Tandy paper and this gives a little better quality. Advantages are that it is cheap, about £59.00, and plugs straight into the peripherals port either ZX81 or Spectrum. Disadvantage is that the print quality is faint and really only good enough for listings, also a 32-character line length is fixed.

Seikosha supply the best stand-alone printer for the Spectrum and ZX81 with their GP50S. This is a full dot matrix job with ribbon. The quality is excellent but again you are tied to 32 chars per line for all practical purposes, and you'll need an extender to operate it with the ZX81. At £69.00 plus VAT it is a good buy, and an excellent machine for producings listings, but can only be used with a Spectrum or ZX81, so you're stuck if you want to upgrade at sometime in the future.

'Real' printers

So you decide that you want to do some serious word processing and perhaps a little filing and spreadsheet work and so you need a better printer.

To go into the printers on the market and describe price, type and quality is enough to fill a book! To be very simplistic about it, a DOT MATRIX printer produces characters on paper by punching a series of dots through an inked ribbon onto the paper.

A DAISY WHEEL uses the typewriter system. The shapes of all the letters and symbols are moulded onto a rotating wheel, which strikes the whole character onto the paper all at once.

The Dot Matrix printers are cheaper and the quality varies. They run from about £150 to £500+ and the quality of the printing tends to rise along with the cost. The Citizen 120D printer (I reviewed in April) costs around £235 and in NLQ mode (Near Letter Quality) was good enough to produce business letters and accounts and, at a push, official documents.

A big advantage is that they can produce graphic characters, we use a Shinwa CP80 to produce the Spectrum and QL listings and it copes with the graphics perfectly. This costs around £180.00.

These printers are fairly fast, around 80 to 120 characters per second, although as certain modes are used the speed slows — NLQ on the Citizen ran at 25 CPS. They can be a little noisy but not excessively so.

Letter quality

For perfect letter quality a DAISY WHEEL is essential. These are relatively expensive, starting at about £250, and are slow — 20/30 CPS — and usually very noisy.

DW printers cannot cope with graphics and changing typeface is awkward. They are nowhere near as versatile as the dot matrix type, but if all your output is to be letters and manuscripts then they are generally superior.

Both types of printer can print with a differing number of characters per line, usually with a maximum of about 125 CPL.

Connections

As usual in the computer business there is no one standard of connection, however it does boil down to two main systems used in Britain, the RS232 and the CENTRONICS.

The QL has a built in RS232 port which will connect via a cable to any printer which operates on this system. There are companies which market a CENTRONICS port for the QL in order to let you use this type.

The Spectrum has no standard printer ports, but ZX Interface 1 an RS232 port which can be used with RS232 printers, or to operate microdrives. The Rotronics Wafadrive system has a built in Centronics port and so has the Opus Disk drive system.

As you can see there is a third complication, that of deciding whether you intend to use any of these storage devices, if so then it could influence your choice of printer. If you decide to buy a separate printer interface then you have freedom of choice between types and there are many to choose from. The Kempston E is very good and has built in software which removes the need to load in a program before using it, and the ZX Lprint 3 is excellent, also having on board software and providing *both* RS232 and Centronics ports.

The choice

It is my personal opinion that the RS232 system is more difficult to operate and in some ways more limited than the Centronics.

To explain how to operate a printer is impossible here, but let me say that you will need to take time to read in detail the manual.

Nevertheless when all is said and done, once you have bought the bits, trial and error is the order of the day.



The universe needs saving in Tantalus, the latest game from Quicksilva. Here's your chance to be the hero of the hour in our great Quicksilva competition, with ten copies of Tantalus and ten space-age Speedking joysticks up for grabs!

COMPETITION

Tantalus is the latest game from Quicksilva, the people who brought you Ant Attack, Bugaboo and Flea and Glass (among others). Set on a planet light years away, Tantalus pits you against hordes of deadly aliens and a massive, heavily defended fortress as you attempt to come face to face with The Enemy. Quicksilva are offering ten copies of Tantalus to ZX readers, but that's not all! To help you take on the enemy and fight your way through the fortress each winner will also receive a Speedking joystick — just the thing for some heavy duty alien zapping.

Tantalus facts

Entering the competition is simple. All you have to do is answer a few simple questions about the game. Now, this might seem a bit tricky since you won't have seen the game yet but if you just turn a few pages to our preview of the game you'll find all the information you need. We can't make things any easier than that can we? So, here we go...

1) What is the name of the Author of Tantalus?
2) How many screens are there in the game?
3) What is the name of the hero of the game?
4) Tantalus is the sequel to which other Quicksilva game?

When you've got all the answers just fill write them on the coupon on this page, along with your full name and address and send it in to ZX by the 4th July 1986. Please write your answers on the back of the envelope.

The competition is open to all readers of ZX Computing Monthly, except employees of Argus Specialist Publications, Alabaster Passmore and Sons and Argus Press Software. The winners will be announced in a future issue of ZX, and the Editor's decision is final.

Tantalus Competition Coupon

The answers to the questions are:

1 ....

2 ....

3 ....

4 ....

Name ....

Address ....

....

....

When you have completed this coupon send it to: Tantalus Competition, ZX Computing Monthly, 1 Golden Square, London W1R 3AB. Remember to write your answers on the back of the envelope. Entries should arrive by first post on Friday 4th July 1986.

CROSSFIRE

Why not drop a line to Crossfire to express your opinion about any aspects (good and bad) of computing and games playing with Sinclair machines?

But what about the '81?

May I congratulate you on making the transition to a monthly magazine. The new magazine is, if I may say so, even better. But please more pages on the ZX81. While on the subject have any of your readers got a copy of Great Britain Ltd by Hessel, Black Crystal or Pilot by Hewson Consultants? If so would they contact me.
Wayne Thickett, 8 Vicarage Close, Amblecote Bank, Brierley Hill, West Midlands.

Although coverage of the ZX81 has diminished now that ZX is monthly we are still the only Sinclair magazine supporting the machine to any extent. Page 81 is intended to provide both useful hints and tips as well as act as a forum for news and information from and for ZX81 users.

Software Farm

I have been trying to contact the ZX81 Software House, Software Farm of Bristol with no success. I would be disappointed to hear that they were no longer in business. Could you please advise me to the fate of Software Farm, and to my membership in it's Software Club.
John H. Sandgren, Connecticut, USA.

Enquiries confirm that Software House is no longer trading. We have been unable to contact the proprietors and currently have no details of the Software Club's fate.

Pen Pals

I am 19 years old and have a 48k Spectrum. I am originally from England and would like Spectrum users from all over the world to write.

Games and books for the Spectrum are hard to come by over here and the exchange rate is too high for import so I would welcome pen pals.
Peter Hancox, PO Box 3684, Swakopmund 9000, South West Africa.

Blast from the past

Where have all the mega-blasting rapid fire space games gone? All my friends and I agree that the new trend in games seems to be wee, funny walking men who pick up objects to escape from castles, space craft etc. I am sure that if the companies brought out a game we don't need seven 'O' levels to play, the game would shoot to the top of the charts.
Hamish Buchan, Glasgow.

Grounded

As a relative newcomer to computers and being totally baffled by all the jargon, I'm desperate for help and having just read the April issue of your magazine I wondered if you could advise me on the best way of acquiring a selection of flight simulator programs. I'm led to believe that there is or was a 737 simulation but can I get a copy for my Spectrum+? By the way I bought Spitfire 40 and Flyer Fox, but oh what a disappointment, they just didn't compare with my old copy of Psion Flight Simulation.

Maybe because I work on aircraft and fly a great deal I'm going to be hard to please.
R. Arnold, Derby.

Yes there is a 737 simulation available for the Spectrum from Anco (0332 92518) price £5.95. Another flight simulation available is Night Flight from Hewson £7.95. A slightly different approach to flying can be found in Heathrow Air Traffic Control also from Hewson £7.95, and Digital Integration have a very complex helicopter flight simulation called Tomahawk which costs £9.95.



Psion's Flight Simulation: still the best?

micronet
MEGA-OFFER!




Bombjack

ZX is offering through Micronet a complete communications package at a saving of over £25 with a free download of Bombjack into the bargain.

Logging on with Micronet has never been cheaper. This special offer gives you a VTX modem, three months' subscription to Micronet and Prestel plus the chance to download Elite's Bombjack (a monster hit in our last issue), absolutely free.

Currently the recommended retail price of the VTX 5000 is £49.95, a quarterly subscription to Micronet costs £16.50 and the download charge for Bombjack is £6.95 but ZX, in conjunction with Micronet, is presenting this complete package for just **£40!**

With Micronet you can join over 20,000 other subscribers who use the system for everything from sending free electronic mail to playing the multi-user game Starnet. There are bulletin boards, chatlines, teleshopping, interactive games, telesoftware and much more to be found on Micronet's 40,000 pages. And when you join Micronet you automatically gain access to Prestel with hundreds of thousands of pages of news and information on a multitude of subjects.

All you have to do to get on line is complete the coupon and send it to the address shown and soon you'll have your private identity number and pass word which will give you access to the exciting world of communications.

ZX/Micronet 800 Offer

Please send me a VTX5000 modem, a three month subscription to Micronet 800 and Prestel plus the option of a free download of Bombjack!

I enclose a cheque/postal order for £40:
or please debit my Access/Visa card No:

Name ....
Address ....
....
....
.... Post Code ....

Make cheques payable to Telemap Ltd. Allow 28 days for delivery.
Send this coupon to **ZX/Micronet Offer, Micronet 800, Telemap Ltd, 8 Herbal Hill, London EC1R 5EJ.**

STARSTRIKE II

Realtime have discovered 'shaded graphics' on some faraway planet and brought them back for Starstrike II.



Starstrike II
Realtime Games
£7.95

Space — the final frontier. These are the voyages of the star ship Starstrike. Its ongoing mission; to seek out as many space ships as you can find and blast them all into tiny little bits.

Starstrike II, the sequel, believe it or not, to Starstrike, is another of the 3D space shoot 'em ups following in the wake of Elite. What you think of this particular game probably depends very much on how you like your shoot 'em ups. If you like them to be a straightforward series of showdowns between yourself and endless enemy spacecraft then you're probably going to like this. If, on the other hand, you liked the added non-violent elements that Elite contained in the interplanetary wheeling and dealing aspects then you might find Strike II a bit monotonous.

As the pilot of the Starstrike II vessel it is your task to lead the forces of the Federation into the planetary systems occupied by your enemies, The Outsiders. Their 22 home planets are grouped around five stars in The Lesser Magellanic Cloud, and fall into three categories: Agricultural, Industrial, and Military.

All of these planets have their layers of defences in the form of ground defenders, orbital fighters and planetary defence fields, whilst some of the industrial and all of the military planets have space stations that you must get past. As in Elite there is a docking sequence involving these space stations, but once successfully docked you can go straight into the next phase of the planetary defences — there is no trading element involved.

In order to successfully neutralise each planet you must get past its defences and locate either a battle computer, reactor or control computer before moving on to the next planet or star system.

Your own craft is armed with a laser which is aimed by using a set of crosswires. Other controls are fairly simple: there are three onscreen displays showing the status of your laser, fuel and force field, and when in space there are two displays, again similar to those in Elite, which help you to locate enemy craft and fuel supplies. Navigation controls are Up, Down, Left, Right and Accelerate/Deccelerate, and while joystick control was perfectly okay I found that the choice of keyboard controls was rather awkward and it would have been nice if these could have been redefined.

In some ways Starstrike II is an improvement upon Elite and some of its clones because the programmers at Realtime have managed to take the graphics a step further than in any other games of this sort. Instead of drawing all the spacecraft in simple outlines, Starstrike II uses solid, shaded graphics which enhance the 3D effect and give a greater appearance of depth to many of the scenes in the game. But the improvement in graphics has clearly taken its toll on the power of the Spectrum and other elements of the game suffer as a result. Sound is totally lacking throughout the game, and though many people find the Spectrum's beep irritating I found the silence a bit boring.

The increased complexity of the graphics give the Spectrum a lot more work to do, and the speed of movement of both your own and the enemy craft is a bit slower than in most similar games. This didn't really affect the enemy craft, which still moved to fast for me to catch most of them, but it does seem to affect the responsiveness of your own craft a bit. Even so I prefer this to most of the recent space combat games, and though I still think that Elite sets the standard it should be mentioned that Starstrike II costs some £7 less than that game and is therefore likely to be within the price range of a lot more people.

GREAT

QL COLUMN

Brian Beckett with the latest news on the troubled QL.

Prophecy is a hazardous hobby. Last month, I went on about the chances of Sinclair opting for a revamped QL package which included a built-in 3.5" disc drive, memory expansion and a colour monitor aimed to sell at around £350. I concluded that Sir Clive was unlikely to do it for a while because of the company's shakey financial position but — instead of taking my words to heart — he chose to sell the firm instead.

Now it's a case of either a new QL or no QL at all. Amstrad bought out Sinclair (at a bargain basement price) to get its hands on the ever popular Spectrum but, at least for the moment, simply doesn't want to know about the QL. This could well change if the boffins in Amstrad's R&D department find an economical way of building in a disc drive but, even so, the company would be investing money in a machine which directly competes with its own products and that doesn't really make a great deal of business sense.

QL sell off?

The likely alternative is that Amstrad will sell its QL rights to a consortium of companies already involved in marketing peripherals and software for the ill-fated computer. There is already some talk about a new-model QL produced by such a consortium but such ideas are a long way from anything resembling reality. Talking about launching a new computer is all well and good and it warms the heart with the spirit of adventure but it wouldn't be a bad idea to get the old QL on something like the right foot first. Had Sinclair taken such a bold step — or if Amstrad now did it — that would have been one thing, but for a group of companies who have spent their time marketing a variety of competing peripherals (and to a lesser extent competitive software), it's going to require a whole reorganisation and the sort of unified, well-considered marketing strategy that has so far eluded Sir Clive's brain child. A little bit of luck wouldn't go amiss either.

If and when this QL Ltd consortium takes over, one marketing ploy stands out before all. There is a crying need to rationalise the QL's varied peripherals, add-ons and god-knows-what into a coherent product range. Sinclair's tactic of marketing a bare-bones computer like the (original) Spectrum and leaving it to the customer to pick and choose his add-ons as the mood strikes him was a brilliant innovation when appealing to home enthusiasts. But is just didn't work for the QL which was offered as a serious, heavy-duty, would-be business machine. Business users like their hands held in computing, all the way from purchase through tailor-made (or selected) software to after-sales services. They do not want to attend countless ZX Microfairs or comb through endless computing magazines looking for the 'right' peripheral or add-on in a sea of conflicting claims and products.

If QL Ltd is to do anything more than just fight a holding action, the microdrives are going have to go in exchange for a built-in disc drive. This is the most obvious rationalisation but what abouut all the endless memory upgrades floating around? There are internal upgrade kits, external RAM boards (with and without disc interfaces) utilising the left-hand expansion slot, daisy-chaining expansion modules that allow both RAM boards and disc interface attatchments as well as the odd Centronics port. The whole business is a complete muddle and the best thing that QL Ltd could do would be to market a 512K computer and get it over with. In the meantime, QL Ltd could offer a three-way choice; the basic 128K gadget, an expanded QL from Silicon Express (which currently boosts the RAM to 512K for £150) or a 256K internal RAM board from Micro Peripherals. Micro Peripheral's board now sells for £99.95 and is simple to install as long as you're not the nervous type. This takes the QL to a total 384K but, since it won't work with any additional memory in the expansion slot, that's your lot. But it's enough for a lot of users (and probably more than they need in quite a few cases). It also makes a compact and efficient alternative to the various lego-like plug-in RAM's now abounding.

Comms

As for communications, the QL now looks pretty good. Tandata's three-module package is now selling at aroune £150 (including the dreaded VAT) which isn't bad for a modem, auto-answer/auto-dial and intelligent interface with the necessary telecommunications software. Backing it up is Modem House's QL Brightstar as a good alternative buy (it will also work with Tandata's interface) which is capable of 300/300 baud communications as well.

Printers aren't a real probelm but QL Ltd would be wise to push Sinclair's long-term project of developing one especially designed to go with the QL. This won't necessarily mean a better printer than those now available but it would take away the worry of a Centronics interface (where the richest variety of choice now lies) and remove the burden of decision from those who feel most comfortable with all-in packages.

Eidersoft has a QL mouse due out soon (its actually been due out soon for a while) and this would be a nice addition to potential small-business buyers. It would also go nicely with Eidersoft's ICE desk-top software (£59.95) which is a shade awakward to use with only the cursor keys. At the moment, some West Germans are offering a QL mouse and their own desk-top software but they don't seem to be working overtime at it and Eidersoft should have a pretty clear shot a capturing the market.

QL Ltd's main hurdle may be the old vicious software circle. When the QL stumbled on launch, a lot of the software houses took a 'wait and see' approach and because there wasn't a wealth of quality programs about the poor computer found it harder to find a niche in the market. The software houses then decided to wait and see a bit longer and so on *ad infinitum*. The last year has seen some good and even excellent packages come on-stream but I doubt if they are enough without the Sinclair or Amstrad name behind the computer. If QL Ltd gets off the ground, its first problem will be convincing software houses that the QL is still a viable product, and would-be customers that it is a realistic alternative to similar computers marketed by other well-known companies.

PROGRAM

```
1 REMark &&&& J A V E L I N &&&&
2 REMark
3 REMark  !!!!  A.DIDCOCK  !!!!
4 :
10 MODE 8:hiscore=0: udgs
20 f_level
40 draw_main_screen
50 draw_power
60 initialise
69 :
90 REPeat game
100  event_1
110  IF NOT qualify THEN end_routine: GO TO 20
200  next_level
210  IF NOT qualify THEN end_routine: GO TO 20
215  level=level+.5
220 END REPeat game
699 :
700 DEFine PROCedure hi_scores
705 LOCal i
707 hi(event,0)=distance
708 hi$(event,0)=a$
710 IF hi(event,0)>hi(event,1) THEN
720  wr=wr+1
730  FOR i=3 TO 1  STEP -1
740   hi(event,i)=hi(event,i-1)
750   hi$(event,i)=hi$(event,i-1)
760  END FOR i
762  RETurn
764 END IF
766 IF hi(event,0)>hi(event,2) THEN
770  hi(event,3)=hi(event,2):hi$(event,3)=hi$(event,2)
772  hi(event,2)=hi(event,0):hi$(event,2)=hi$(event,0)
774  wr=wr+1
776  RETurn
778 END IF
780 IF hi(event,0)>hi(event,3) THEN
782  wr=wr+1
784  hi(event,3)=hi(event,0):hi$(event,3)=hi$(event,0)
786  RETurn
788 END IF
790 END DEFine
799 :
800 DEFine PROCedure reset
810 STRIP #3,7,0
820 AT #3,1,8:PRINT #3,"                              "
830 INK #3,2: STRIP #3,7
840 AT #3,1,36:PRINT #3,"00:"
850 END DEFine
2999 :
3000 DEFine PROCedure event_1
3005 event=1:pos=2:CLS #7
3010 INK #4,7:FOR i=2 TO 4:AT #4,i,14:PRINT #4,"00.00":END FOR i
3015 qual=0
3020 REPeat jav_loop
3025 draw_jav
3030 foul=0:power=8:reset:dist=0:me=0
3035 key1=0:key2=0:char=132:n=0:co=0
3040 CSIZE 2,1:STRIP 2:INK 5:AT 9,8:PRINT CHR$(132)
3045 INK 7:LINE 25,26 TO 35,26
3050 CSIZE 2,0:INK 2:PAPER 4:AT 10,3:PRINT "YOUR GO:"
3055 FOR i=100 TO 10 STEP -1:BEEP 300,i:END FOR i
3056 PAUSE 40000
3060 BEEP 1000,5
3065 AT 10,3:PRINT "          ":AT #3,1,power:STRIP #3,0:PRINT #3," "
3067 CSIZE 2,1
3070 FOR i=1 TO 34
3075  key1=KEYROW(1)
3080  BEEP 300,100
3083  IF key1>=64 AND key1<100 THEN EXIT i
3085  IF key1<>0 AND key1<>key2 AND power<23.5 THEN n=n+1
3090  IF n=INT(level) THEN power=power+1:n=0
3095  IF power>8 AND (key1=0 OR key1=key2) THEN power=power-.2
3100  AT #3,1,power:STRIP #3,0:PRINT #3," ":STRIP #3,7,0:AT #3,1,power+1:PRINT #3," "
3105  key2=key1
3110  IF char=133 THEN char=132: ELSE char=133
3115  INK 2:STRIP 2
3120  LINE 25,26 TO 35,26:AT 9,8:PRINT " ":PAN #8,-10:INK 5:AT 9,8:PRINT CHR$(char):INK 7:LINE 25,26 TO 35,26
3124  co=co+1
3125  IF co=10 THEN INK 2:CSIZE 2,0:STRIP 1:AT 19,37:PRINT me+10
3126  IF co=10 THEN LINE #8,1451,100 TO 1371,0:co=0:me=me+10
3127  CSIZE 2,1:INK 5:STRIP 2
3180 END FOR i
3185 IF i=34 THEN foul=1
3186 dist=-((33-i)):power=power*1.14
3190 IF NOT foul THEN throw_jav: GO TO 3200
3191 CSIZE 2,0
3192 distance=0
3193 STRIP 1:INK 2:FLASH 1:AT 14,2:PRINT "FOUL":BEEP 0,30,37,9000,7,0,0,0:FLASH 0
3194 FOR i=1 TO 1000:END FOR i:BEEP
3195 INK #4,7:AT #4,pos,14:PRINT #4,"-----"
3200 pos=pos+1
3205 INK #4,2
3210 IF score>9 AND score<100 THEN AT #4,0,10:PRINT #4,score
3215 IF score>99 AND score<1000 THEN AT #4,0,9:PRINT #4,score
3220 IF score>999 AND score<10000 THEN AT #4,0,8:PRINT #4,score
3221 IF score>9999 THEN AT #4,0,7:PRINT #4,score
3225 hi_scores
3230 print_hi_scores
3235 FOR i=1 TO 1500:END FOR i
3236 STRIP 4
3240 AT 11,1:PRINT "                              "
3241 AT 14,2:PRINT "      "
3245 IF pos=5 THEN EXIT jav_loop
3250 END REPeat jav_loop
3255 qualify=qual
3260 END DEFine
3299 :
3300 DEFine PROCedure throw_jav
3305 BEEP 1000,5
3310 angle=10:STRIP #3,7:INK #3,2
3315 AT #3,1,36:PRINT #3,angle
3320 REPeat key_jav
3325  IF KEYROW(1)=0 OR angle>80 THEN EXIT key_jav
3330  angle=angle+3
3335  AT #3,1,36:PRINT #3,angle
3340 END REPeat key_jav
3342 BEEP 1000,5
3345 x=25:y=28
3350 h=angle/60: a=angle/12:b=SQRT(100-(a*a)):hh=1:a1=a:ha=0
3355 INK 2:LINE 25,26 TO 35,26:INK 7:LINE x,y TO x+b,y+a
3356 IF angle>50 THEN power=power-(angle/10)
3357 i=1
3358 IF angle<30 THEN power=power-1
3360 REPeat mve_jav
3362 y1=y
3370 PAN #8,-10
3373 co=co+1: dist=dist+1
3374 IF co=10 AND me<90 THEN INK 2:CSIZE 2,0:STRIP 1:AT 19,37:PRINT me+10
3375 IF co=10 THEN LINE #8,1451,100 TO 1371,0:co=0:me=me+10
3380 IF (y+h)+a<64 AND NOT ha THEN y=y+h
3384 IF y+a<28 THEN EXIT mve_jav
3385 INK 4:LINE x,y1 TO x+b,y1+a1:INK 7:LINE x,y TO x+b,y+a
3386 a1=a
3390 IF i>(power*3)*.7 AND hh THEN hh=0:h=-h:a=-a:ha=0
3396 IF i>(power*3)*.5 AND hh THEN ha=1
3397 i=i+1
3399 END REPeat mve_jav
3402 PAN #8,-29
3405 INK 4:LINE x,y1 TO x+b,y1+a1:INK 7:LINE x,y+a TO x+b,y+(a+a)
3410 CSIZE 2,1:INK 2:STRIP 4
3412 distance=dist+(INT(RND(1 TO 98))/100)
3413 CSIZE 2,0
3414 IF distance<1 THEN distance=0:dist=distance
3415 AT 11,1:PRINT "YOU THROW WAS ";distance;"m"
3420 IF distance>70.23 THEN qual=1
3425 score=score+(dist*5)
3430 IF distance<10 THEN INK #4,7:AT #4,pos,14:PRINT #4,"0";distance: ELSE INK #4,7:AT #4,pos,14:PRINT #4,distance
3440 END DEFine
11999 :
12000 DEFine PROCedure draw_jav
12005 OPEN #8,scr_492x25a10x183
12010 PAPER #8,2: INK #8,7: CLS #8
12020 print_hi_scores
12035 INK #4,6:AT #4,6,9:PRINT #4,"JAVELIN  "
12036 CSIZE 2,0
12040 INK 0: STRIP 4:AT 8,1:PRINT "QUALIFYING DISTANCE = 70.23m"
12050 FILL #8,1:LINE #8,1410,100 TO 1330,0:LINE #8,1450,100 TO 1370,0:FILL #8,0
12060 PAPER #8,1:INK #8,1
12065 FILL #8,1:LINE #8,1451,100 TO 1371,0:LINE #8,1520,100 TO 1520,0: FILL #8,0
12066 INK #8,6
12070 END DEFine
19999 :
20000 DEFine PROCedure draw_main_screen
20010 WINDOW 512,256,0,0
20020 PAPER 4
20030 SCALE 100,0,0
20040 BORDER 5,1
20050 CLS
20060 OPEN #3,scr_511x30a2x226
20070 PAPER #3,7
20080 BORDER #3,1,3
20090 CLS #3
20100 OPEN #4,scr_492x78a10x5
20110 PAPER #4,0
20120 BORDER #4,1,7
20130 CLS #4
20140 INK #4,2
20145 CSIZE #4,2,0
20150 AT #4,0,0:PRINT #4,"SCORE: 00000      EVENT 01      LEVEL 0";level
20160 INK #4,5
20180 LINE #4,235,88 TO 235,24
20190 LINE #4,0,24 TO 480,24
20200 INK #4,7
20210 AT #4,2,2:PRINT #4,"FIRST:  "
20220 AT #4,3,1:PRINT #4,"SECOND:"
20230 AT #4,4,2:PRINT #4,"THIRD:  "
20270 INK #4,3
20280 AT #4,1,24:PRINJ #4,"WORLD RECORDS"
20290 INK #4,7
```

JAVELIN

By Alan Didcock

The Spectrum has had all sorts of sports simulations available for it from Kung Fu to Decathlons, but now QL users can join the Daley Thompson crowd with this sports simulation.

RUN UP

Pounding the Left/Right cursor keys builds up power and speed, and the fire button must be pressed to throw or jump. The length of time that you hold down the space bar determines the angle of throw/jump, and this is indicated in the bottom right of the screen.

To advance onto later events you have to equal the qualifying distance and score — so no goofing off!

D.I.Y.

```
20300 AT #4,2,21:PRINT #4,'1st'
20310 AT #4,3,21:PRINT #4,'2nd'
20320 AT #4,4,21:PRINT #4,'3rd'
20460 INK #4,6
20470 AT #4,6,0:PRINT #4,'  EVEN
T:                WORLD RECORDS: 0
0'
20480 INK #3,2
20490 AT #3,1,1:PRINT #3,'SPEED:
'
20500 AT #3,1,29:PRINT #3,'ANGLE
:':STRIP 5:AT #3,1,36:PRINT #3,'
00:'
20510 END DEFine
20599 :
20600 DEFine PROCedure draw_powe
r
20605 RESTORE 30000
20610 FOR i=8 TO 24 STEP 3
20611  READ col
20615  STRIP #3,col
20620  AT #3,0,i:PRINT #3,'   '
20630  STRIP #3,7,0::AT #3,1,i:P
RINT #3,'   '
20660 END FOR i
20670 END DEFine
20999 :
21000 DEFine PROCedure initialis
e
21005 RANDOMISE
21015 OPEN #7,scr_492x142a10x84:
 PAPER #7,4
21030 score=0
21040 DIM hi(1,4)
21050 DIM hi$(1,3,3)
21090 hi$(1,1)='AAA'
21100 hi$(1,2)='BBB'
21110 hi$(1,3)='CCC'
21120 event=1: events=0
21130 wr=0
21170 hi(1,1)=96.91
21180 hi(1,2)=94.56
21190 hi(1,3)=90.56
21260 round=1
21270 DIM ql(3)
21280 ql(1)=1200
21285 ql(2)=1000
21290 ql(3)=800
21900 END DEFine
21999 :
22000 DEFine PROCedure print_hi_
scores
22005 INK #4,6
22010 IF wr<10 THEN AT #4,6,38:P
RINT #4,wr
22020 IF wr>9 THEN AT #4,6,37:PR
INT #4,wr
22030 INK #4,7
22040 FOR i=1 TO 3
22045  IF hi(event,i)<10 THEN
22050   AT #4,i+1,27:PRINT #4,'0
';hi(event,i)
22055  ELSE
22057    AT #4,i+1,27:PRINT #4,h
i(event,i)
22058  END IF
22060  AT #4,i+1,37:PRINT #4,hi$
(event,i)
22070 END FOR i
22080 END DEFine
22999 :
23000 DEFine PROCedure f_level
23010 WINDOW 512,256,0,0
23020 PAPER 4
23030 STRIP 1: INK 6
23040 CSIZE 2,1
23050 BORDER 5,5
23060 CLS
23065 AT 0,13:PRINT 'J A V E L I
N'
23070 INK 0: CSIZE 2,0: STRIP 2
23080 AT 3,10:PRINT 'FOR THE SIN
CLAIR QL'
23090 INK 7:STRIP 0:AT 5,14:PRIN
T 'by A.DIDCOCK'
23100 INK 1:STRIP 4
23120 AT 12,2:PRINT '1/ Simple'
23130 AT 14,2:PRINT '2/ Medium'
23140 AT 16,2:PRINT '3/ Difficul
t'
23145 INK 0
23150 AT 10,0:INPUT 'WHICH LEVEL
 DO YOU WANT TO PLAY ON ? ';leve
l
23155 BEEP 500,5
23160 IF level<1 OR level>3 THEN
 GO TO 23150
23165 level1=level
23170 OPEN #5,scr_512x180a0x75
23180 PAPER #5,4
23190 BORDER #5,4,5
23200 CLS #5
23210 INK 1
23220 AT 12,8:PRINT '(HAS TO BE
3 CHARACTERS)':AT 15,2:PRINT 'eg
. INITIALS: ADD'
23230 INK 0
23240 AT 10,7:INPUT 'ENTER YOUR
IDENTIFYING CODE: ';a$
23245 BEEP 500,5
23250 IF LEN(a$)<>3 THEN GO TO 2
3240
23260 END DEFine
23999 :
24000 DEFine PROCedure end_routi
ne
24005 BORDER: BORDER 5,1
24010 PAPER 4:CLS
24020 CSIZE 2,0:INK 1,2:STRIP 4
24030 AT 1,7:PRINT 'YOU HAVE FAI
LED TO QUALIFY '\'           FO
R THE NEXT EVENT'
24040 INK 2
24050 AT 7,1:PRINT 'YOU SCORED '
;score;' POINTS'
24060 AT 9,6:PRINT 'AND ACCUMULA
TED ';wr;' WORLD RECORDS'
24070 AT 11,20:PRINT 'ON LEVEL '
;level1
24080 INK 0
24090 AT 13,1:PRINT 'YOU ALSO CO
MPLETED ';events;' EVENTS'
24095 IF score>hiscore THEN hisc
ore=score
24096 AT 15,9:INK 2,0:PRINT 'THE
 HI-SCORE IS ';hiscore
24100 INK 1
24102 BEEP 0,0,20,-5000,-200
24105 FOR i=1 TO 2000:END FOR i
24110 AT 19,6:PRINT 'PRESS ANY K
EY TO PLAY AGAIN'
24120 PAUSE 40000
24130 BEEP 300,10
24140 END DEFine
24999 :
25000 DEFine PROCedure next_leve
l
25005 reset: events=events+1
25010 CLS #7:CSIZE 2,0:INK 1,2:S
TRIP 4
25040 round=round+1
25050 IF (score/(round-1))<ql(le
vel1) THEN qualify=0: ELSE quali
fy=1
25055 IF NOT qualify THEN RETurn

25070 IF qualify THEN FLASH 1:AT
 15,2:PRINT 'YOU HAVE QUALIFIED
FOR THE NEXT ROUND':FLASH 0
25080 FOR i=1 TO 3000:END FOR i
25085 CLS #7: BEEP 1000,5
25090 END DEFine
29999 :
30000 DATA 5,1,6,4,3,2
31999 :
32000 DEFine PROCedure udgs
32005 start=RESPR(100)
32010 a0=65537
32020 a2=start+6
32030 RESTORE 32100
32040 FOR i=0 TO 25: READ byte:
POKE start+i,byte
32050 CALL start,0,0,255,37,0,0,
0,a0,0,a2
32060 END DEFine
32099 :
32100 DATA 32,4,78,67,78,117
32110 DATA 132,2
32160 DATA 88,88,112,52,60,48,56
,40,76
32170 DATA 88,88,112,48,48,48,16
,16,48
```

One Day Cricket



By Andrew Finch

England's cricketers can't seem to bat their way out of a paper bag these days, so here's a chance for QL owners to go to bat for themselves.

D.I.Y.

One Day Cricket can be played by one or two players, the normal rules of the game are used and a score card is shown at the end of each over.

Type in the listing and check it. It can then be saved by putting a cartridge in mocrodrive 1 and entering **SAVE mdvl_cricket**. To run the game use **LRUN mdvl_cricket**. Full prompts are given by the game, so off you go — let's show Gooch and Botham where they're going wrong!

Listing 1

```
10 REMark * * * ONE DAY CRICKET
* * *
20 REMark ---------------------
-----
30 REMark procedures start st li
ne 5000
40 REMark ---------------------
-------
50 set_up_teams
60 toss_coin
70 fielder_positions
80 set_variables
85 flag=0
90 score_sheet
100 get_bowler
120 open_windows
130 play_over
180 GO TO 90
4999 REMark -------------------
-------------------------------
--------
5000 DEFine PROCedure set_up_tea
ms
5002 DIM score(2),name$(2,16),wi
ckets$(2,7):score(1) = 0:score(2
)=0:team_batting = 1 :no_of_in=0
:wickets$(1)='0':wickets$(2)='0'
5005 DIM team$(2,11,10) : RESTOR
E 5015 : name$(1)="ENGLAND" : na
me$(2) = "AUSTRALIA"
5010 FOR n=1 TO 11 : READ team$(
1,n) : READ team$ (2,n)
5015 DATA 'Gooch','Wood','Rob'so
n",'Hild'ch",'Gower','Wessels','
Gatting','Border','Lamb','Boon',
'Botham','Ritchie','Downton','Ph
il'ps",'Emburey',"O'Don'l",'Edmo
nds','Lawson','Ellison','Thomson
','Taylor','Holland'
5020 END DEFine set_up_teams
5025 REMark -------------------
-------------------------------
--------
5030 DEFine PROCedure open_windo
ws
5035 MODE 8
5040 OPEN #15,scr_512x256a0x0 :
PAPER #15,4: CLS #15 : BORDER #1
5,2,5 : CLOSE #15
5045 info =  6 : OPEN #info,scr_
400x24a50x10
5050 PAPER #info,2 : CLS #info :
 CSIZE #info,0,0 : INK #info,0 :
 BORDER#info,2,7
5060 LINE #info,590,0 TO 590,110
5070 main = 7 : OPEN #main,scr_4
20x170a40x40 : INK #main,0
5075 PAPER #main,4 : CLS #main :
 BORDER #main,1,7
5080 wicket = 8 : OPEN #wicket,s
cr_140x30a175x105
5085 PAPER #wicket,4 : CLS #wick
et:INK#wicket,0
5090 END DEFine open_windows
5095 REMark -------------------
-------------------------------
----------
5100 DEFine PROCedure fielder_po
sitions
5105 DIM fielder_pos_x(11),field
er_pos_y(11) : RESTORE 5115
5110 FOR n = 1 TO 11 : READ fiel
der_pos_x(n),fielder_pos_y(n)
5115 DATA 20,20,90,15,50,52,25,8
5,93,67,170,53,173,96,168,3,140,
85,3,52,133,52
5120 END DEFine fielder_position
s
5125 REMark -------------------
-------------------------------
---------
5130 DEFine PROCedure set_variab
les
5140 wickets_down = 0 : batsman1
 = 1 : batsman2 = 2 : last_bowle
r = 0:next_batsman=3
```

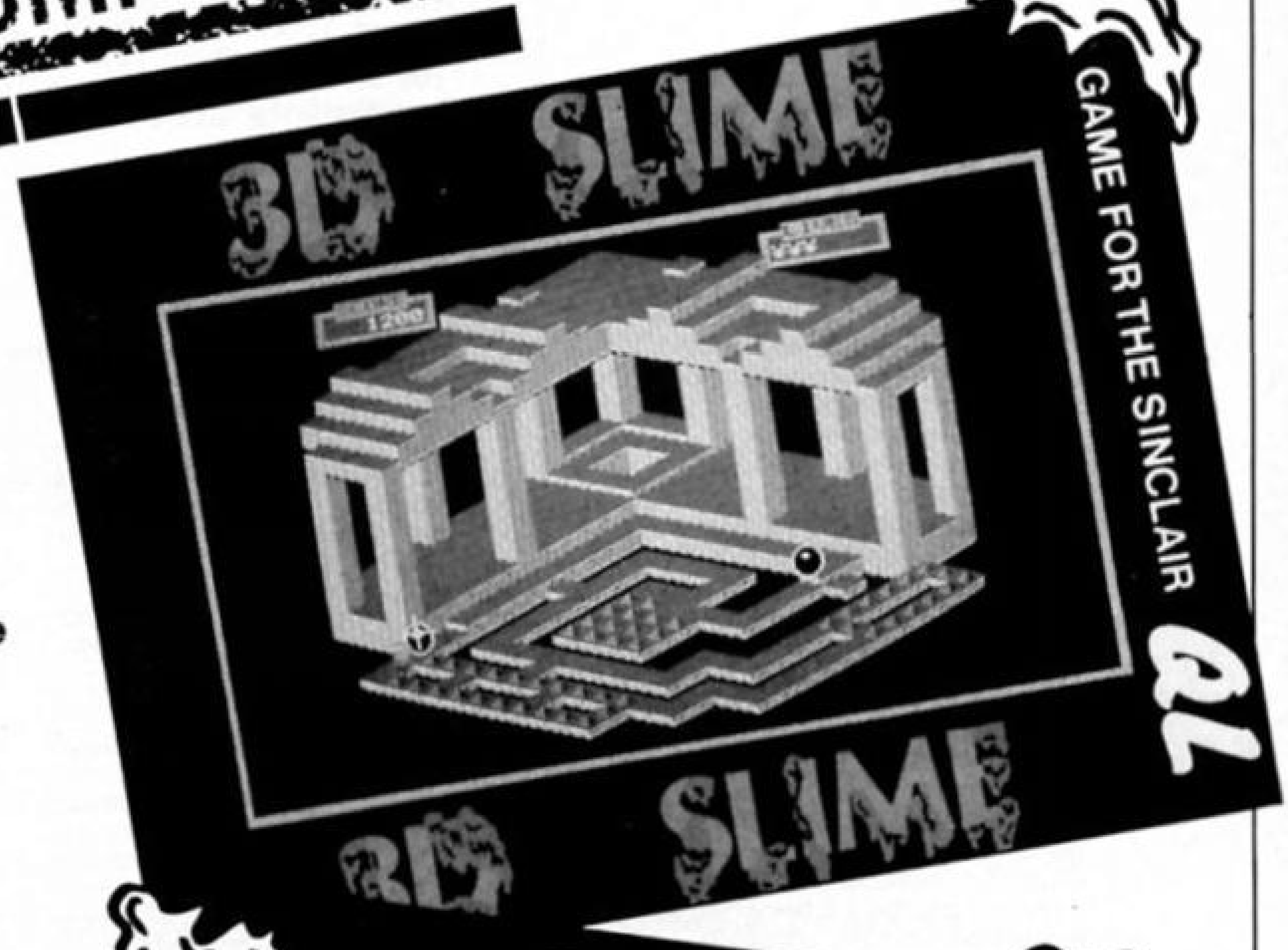
```
5145 present_batsman = batsman1
: batsman1_pos = 1 : batsman2_po
s = 9 : overs = 0 : extras = 0
5150 DIM batsman_score(11),how_o
ut$(11,15) : FOR n = 1 TO 11 : b
atsman_score(n)=0 : how_out$(n)=
''
5151 how_out$(1)='Not Out':how_o
ut$(2)='Not Out'
5155 DIM bowler_wickets(5),bowle
r_runs(5),bowler_overs(5) : FOR
n=1 TO 5 : bowler_runs(n)=0:bowl
er_wickets(n)=0:bowler_overs(n)=
0
5156 boundarys=0 : last_bowler=0
5160 END DEFine set_variables
5165 REMark --------------------
--------------------------------
----------
5170 DEFine PROCedure score_shee
t
5171 IF flag =0 THEN flag = 1:GO
 TO 5175
5172 CLOSE#main:CLOSE #info:CLOS
E #wicket
5175 MODE 4 : OPEN #15,scr_512x2
56a0x0 : PAPER #15,0 : CLS #15 :
 CLOSE #15
5180 CSIZE 0,0 : BORDER 3,2 : PA
PER 0 : INK 7
5185 FOR ploop = 1 TO 11
5186 AT ploop-1,0:PRINT team$(te
am_batting,ploop)
5190 AT ploop-1,20:PRINT how_out
$(ploop)
5200 IF how_out$(ploop)<>'' THEN
 AT ploop-1,40:PRINT batsman_sco
re(ploop)
5201 END FOR ploop
5205 AT present_batsman-1,10:PRI
NT "*"
5210 IF team_batting=1 THEN not_
batting=2 : ELSE :not_batting=1:
END IF
5212 AT 12,0:PRINT 'Overs - ';ov
ers:AT 12,20:PRINT 'Extras - ';e
xtras:UNDER 1:AT 12,40 : PRINT s
core(team_batting);:IF wickets_d
own=10 THEN PRINT ' all out':UND
ER 0:ELSE :PRINT ' / ';wickets_d
own:UNDER 0:END IF
5215 AT 14,0 : FOR n = 1 TO 5
5220 PRINT team$(not_batting,6+n
),,bowler_overs(n),bowler_runs(n
),bowler_wickets(n)
5225 END FOR n:INK#0,0
5230 END DEFine score_screen
5235 REMark --------------------
--------------------------------
----------
5240 DEFine PROCedure get_bowler
5241 overs=overs+1 : IF overs=no
_of_overs+1 THEN overs=overs-1:e
nd_of_innings
5244 REPeat bloop
5245 INK#0,7:1$='12345':PAPER #0
,0:CLS#0:PRINT #0,'What is your
choice of bowler. (1-5)? ';:k$=I
NKEY$(-1):IF NOT  k$ INSTR 1$ TH
EN END REPeat bloop
5256 bowler=k$:IF bowler=last_bo
wler THEN GO TO 5244
5257 last_bowler=bowler : bowler
_overs(bowler)=bowler_overs(bowl
er)+1
5260 PRINT #0;bowler:PAUSE 48:IN
K#0,0:END DEFine
5265 REMark --------------------
--------------------------------
-------
5270 DEFine PROCedure play_over
5271 info_screen : c=1
5275  REPeat naloop
5276 info_screen : AT 0,35:PRINT
 c
5277 IF no_of_in=1 AND score(tea
m_batting)>score(not_batting) TH
EN end_of_innings
5280 CLS#main:set_up_players
5295 PAPER#0,4:CLS #0
5300 bowl : IF RND<1E-2 THEN no_
ball : c=c-1 : GO TO 5330
5301 hit_ball
5302 IF boundarys=1:boundarys=0:
GO TO 5330
5303 IF wc=1 AND RND<5E-3 THEN c
$="CT":out
5304 IF wc=1 THEN GO TO 5330
5305  find_fielder : IF nearest<
3 THEN c$="CT":BEEP 1000,255:FIL
L #main,0:INK#main,7:LINE #main,
70,54 TO ballx,bally:PAUSE 15:IN
K#main,4:LINE#main,70,54 TO ball
x,bally:INK#main,0:POINT#main,ba
llx,bally:out
5306 IF (present_batsman/5)*RND>
1.7 THEN c$="BL":AT #wicket,1,0:
PRINT #wicket;'\*       *!':out
5307 IF RND*(present_batsman/6)>
1.1 THEN c$="LBW":out
5308 IF RND<2.5E-3 THEN c$="ST":
out
5309 BEEP 1000,255:FILL #main,0:
INK #main,7:LINE #main,70,54 TO
ballx,bally:PAUSE 15:INK #main,4
:LINE #main,70,54 TO ballx,bally
:INK#main,0:POINT #main,ballx,ba
lly
5310 byes=0:IF RND<5E-2 THEN bye
s=1:PRINT #0;"BYES":BEEP 5000,10
0,1,2,0:PAUSE 100:CLS#0
5320 play_ball
5330 c=c+1:IF c<7 THEN END REPea
t naloop
5331 IF batsman1=present_batsman
 THEN present_batsman=batsman2:G
O TO 90
5332 present_batsman=batsman1
5335 GO TO 90
5340 END DEFine play_over
5345 REMark --------------------
--------------------------------
---------
5400 DEFine PROCedure set_up_pla
yers
5403 fielder_pos_x(11)=133
5405 FOR pprint = 1 TO 11
5410 FILL#main,1:INK #main,1 : C
IRCLE #main,fielder_pos_x(pprint
),fielder_pos_y(pprint),2
5415 END FOR pprint
5417 INK #wicket,0 : AT #wicket,
1,0 : PRINT #wicket;"!*       *!
"
5420 END DEFine set_up_players
5425 REMark --------------------
--------------------------------
-------
5430 DEFine PROCedure info_scree
n
5435 CLS#info:LINE #info,590,0 T
O 590,110:CSIZE#info,0,0 : AT #i
nfo,0,0 : PRINT #info;team$(team
_batting,batsman1):AT #info,0,7:
PRINT #info;": ";:PRINT #info;ba
tsman_score(batsman1)
5440 AT #info,1,0 : PRINT #info;
team$(team_batting,batsman2):AT
#info,1,7:PRINT #info;": ";batsm
an_score(batsman2)
5445 AT #info,1,14:PRINT #info;s
core(team_batting);" / ";wickets
_down:IF no_of_in=1:AT #info,1,2
3:PRINT #info,'(';score(not_batt
ing)+1-score(team_batting);')'
5450 AT #info,0,14 : PRINT #info
;team$(not_batting,bowler+6);" t
o ";team$(team_batting,present_b
atsman)
5455 END DEFine
5460 REMark --------------------
--------------------------------
---------
5461 DEFine PROCedure bowl
5462 FILL#main,1:INK#main,4:CIRC
LE#main,133,52,3
5465 FILL#main,0:INK#main,1:FOR
bloop=133 TO  118 STEP -2:CIRCLE
#main,bloop,52,2:INK#main,4:CIRC
LE#main,bloop,52,2:INK#main,1
5466 FILL#main,1:INK#main,1:CIRC
LE#main,bloop,52,2:FILL#main,0
5469 INK #wicket,0 : FOR b_path
= 8 TO 2 STEP -1
5470 AT #wicket,1,b_path : PRINT
 #wicket;"."
5475 PAUSE 3 : AT #wicket,1,b_pa
th
5480 PRINT#wicket,' ':END FOR b_
path
5483 fielder_pos_x(11)=bloop
5484 END DEFine
5485 REMark --------------------
--------------------------------
---------
5490 DEFine PROCedure hit_ball
5491 wc=0:IF RND<.3 THEN PRINT#0
,,"WICKET KEEPER":PAUSE 100:wc=1
:CLS #0:END DEFine
5495 ballx=RND (0 TO 186) : ball
y=RND(0 TO 100)
5500 IF ballx<1 OR ballx>180 OR
bally<1 OR bally>99 THEN boundar
y:boundarys=1:END DEFine
5525 END DEFine
5530 REMark --------------------
--------------------------------
---------
5535 DEFine PROCedure play_ball
5538 a_r=0:nof=0:at_ball=0:f=0:w
ic=1
5539 REPeat tloop
5540 INK#0,0:PAPER#0,4:CLS #0 :A
T#wicket,1,0:PRINT #wicket,'!*
     *!': PRINT #0,"Run (y/n)?",
,'Runs - ';nof
5544 k$=INKEY$(-1):IF k$<>'y' AN
D k$<>'n' THEN GO TO 5544
5545 CLS#0:IF "n" INSTR k$ AND a
_r=1 THEN c_batsman: RETurn
5546 IF k$="n" THEN RETurn
5547 one_run
5550 b_f=0:r_c=0:a_r=1
5561 r_c=1
5565 IF r_c=1 AND byes=0 THEN sc
ore(team_batting)=score(team_bat
ting)+1:batsman_score(present_ba
tsman)=batsman_score(present_bat
sman)+1:bowler_runs(bowler)=bowl
er_runs(bowler)+1:a_r=1:nof=nof+
1:ELSE :nof=nof+1:extras=extras+
1:score(team_batting)=score(team
_batting)+1:a_r=1:END IF
5566 IF run_out=1 THEN END DEFin
e
5567 END REPeat tloop
5570 END DEFine
6000 REMark --------------------
--------------------------------
----------
6001 DEFine PROCedure find_field
er
6002 fielderx=0:fieldery=0:neare
st=1000
6003 FOR as=1 TO 11
6010 diff=ABS(ballx-fielder_pos_
x(as))+ABS(bally-fielder_pos_y(a
s))
6020 IF nearest>diff THEN neares
t=diff:fx=fielder_pos_x(as):fy=f
ielder_pos_y(as)
6030 END FOR as
6040 END DEFine
6045 REMark  -------------------
--------------------------------
-------------
6050 DEFine PROCedure c_batsman
6055 IF nof<>(INT(nof/2)*2) AND
batsman1=present_batsman THEN pr
esent_batsman=batsman2:RETurn
6060 IF nof<>(INT(nof/2)*2) AND
batsman2=present_batsman THEN pr
esent_batsman=batsman1
6065 END DEFine
6070 REMark --------------------
--------------------------------
-----------
6080 DEFine PROCedure out
6085 CLS#0:IF c$<>"LBW":PRINT #0
;team$(team_batting,present_bats
man)!'has been ';c$:ELSE :PRINT#
0;team$(team_batting,present_bat
sman)!'is LBW':END IF
```

```
6086 BEEP 20000,1,1,7,2,4,3:PAUSE 100:CLS#0
6090 wickets_down=wickets_down+1
6091 IF c$<>"Run Out" THEN c$=c$&' '&team$(not_batting,bowler+6)
6092 how_out$(present_batsman)=c$:IF c$<>"Run Out" THEN bowler_wickets(bowler)=bowler_wickets(bowler)+1
6100 IF wickets_down=10 THEN end_of_innings
6101 how_out$(next_batsman)="Not Out"
6110 IF present_batsman=batsman1 THEN
6120 batsman1=next_batsman : present_batsman=batsman1
6130 ELSE
6140 batsman2=next_batsman : present_batsman=batsman2
6150 END IF
6160 next_batsman=next_batsman+1
6180 c=c+1:IF c<7 THEN END REPeat naloop
6190 GO TO 90
6195 END DEFine
6200 REMark ------------------------------------------------------
6210 DEFine PROCedure boundary
6215 no=4:IF RND<.2 THEN no=6
6220 batsman_score(present_batsman)=batsman_score(present_batsman)+no:        score(team_batting)=score(team_batting)+no:bowler_runs(bowler)=bowler_runs(bowler)+no
6221 BEEP 1000,255:FILL #main,0:INK #main,7:LINE #main,70,54 TO ballx,bally:PAUSE 15:INK #main,4:LINE #main,70,54 TO ballx,bally:INK#main,0:POINT #main,ballx,bally
6225 CLS#0:PRINT #0;no;" RUNS.":BEEP 20000,255,1,9,1,6,6:PAUSE 50:INK #main,4:POINT ballx,bally
6230 CLS#0:END DEFine
6240 REMark --------------------------------------------------
6250 DEFine PROCedure end_of_innings
6260 flag=0:score_sheet:PAPER#0,0:INK#0,7:CLS#0:PRINT#0,"PRESS ANY KEY TO CONTINUE":k$=INKEY$(-1):CLS#0
6265 wickets$(team_batting)=wickets_down:IF wickets_down=10 THEN wickets$(team_batting)='All out'
6270 CLS : no_of_in=no_of_in+1:IF no_of_in>1 THEN finish
6280 PRINT name$(team_batting);" scored ";score(team_batting);' runs ';:IF wickets_down=10 THEN
6290 PRINT "all out";
6292 ELSE
6294 PRINT 'for ';wickets_down;' wicket(s).'
6296 END IF
6300 PRINT\\ name$(not_batting);' need ';score(team_batting)+1;" runs to win."
6310 PRINT \\\"Press any key to continue":k$=INKEY$(-1)
6312 t=not_batting:not_batting=team_batting:team_batting=t
6313 set_variables
6314 GO TO 95
6320 END DEFine
6330 REMark -----------------------------------------------------
6340 DEFine PROCedure finish
6350 CLS : UNDER 1:PRINT "FINAL RESULT" : UNDER 0
6360 PRINT \\name$(not_batting);' - ';score(not_batting);' runs ';:IF wickets$(not_batting)<>"All out" THEN PRINT 'for ';wickets$(not_batting);' wicket(s).':ELSE :PRINT 'all out.':END IF
6370 PRINT \\name$(team_batting);' - ';score(team_batting);' runs ';:IF wickets$(team_batting)<>"All out" THEN PRINT 'for ';wickets$(team_batting);' wicket(s).':ELSE :PRINT 'all out.':END IF
6380 IF score(not_batting)>score(team_batting) THEN PRINT \\name$(not_batting);' have won by ';score(not_batting)-score(team_batting);' run(s).'
6395 IF wickets$(1)='All out' THEN wickets$(1)='10'
6396 IF wickets$(2)='All out' THEN wickets$(2)='10'
6397 IF score(team_batting)>score(not_batting) THEN PRINT \\name$(team_batting);' have won by ';10-wickets$(team_batting);' wicket(s).'
```



```
6400 IF score(2)=score(1) THEN
6420 IF wickets$(1)<wickets$(2):PRINT \\name$(1);' have won by ';wickets$(2)-wickets$(1);' wicket(s).'
6440 IF wickets$(2)<wickets$(1):PRINT \\name$(2);' have won by ';wickets$(1)-wickets$(2);' wicket(s).'
6460 END IF
6461 IF score(1)=score(2) AND wickets$(1)=wickets$(2) THEN PRINT \\"The match is drawn."
6465 UNDER 1:PRINT \\\"PRESS 'n' TO QUIT ANY OTHER KEY TO PLAY.":UNDER 0
6467 k$=INKEY$(-1):IF k$ INSTR 'Nn' THEN STOP
6468 RUN
6470 END DEFine
6480 REMark --------------------------------------------
6490 DEFine PROCedure no_ball
6500 CLS#0:IF RND<.5 THEN PRINT#0;'WIDE':ELSE :PRINT#0;'No Ball':END IF
6510 extras=extras+1:score(team_batting)=score(team_batting)+1:bowler_runs(bowler)=bowler_runs(bowler)+1:BEEP 5000,0:PAUSE 75
6520 CLS#0
6530 END DEFine
6540 REMark -----------------------------------------------------
6550 DEFine PROCedure toss_coin
6560 MODE 8:OPEN#15,scr_512x256a0x0:PAPER #15,0:CLS#15:CLOSE #15:PAPER 0:INK 7
6565 CLS:INPUT 'How many overs ';no_of_overs$:IF no_of_overs$='' THEN GO TO 6565
6567 no_of_overs=no_of_overs$:CLS
6570 IF RND<.5 THEN team=1:ELSE :team=2:END IF
6580 PRINT name$(team);' have won the toss.'
6590 PRINT \\'Press 1) To bat first'\'       2) To bowl first.'
6600 k$=INKEY$(-1):IF k$<>'1' AND k$<>'2' THEN GO TO 6600
6700 team_batting=1:not_batting=2
6710 IF (k$='1' AND team=2) OR (k$='2' AND team=1) THEN team_batting=2:not_batting=0
6720 END DEFine
6730 REMark -----------------------------------------------------
6740 DEFine PROCedure one_run
6750 run_out=0
6760 FOR wloop=1 TO 9
6770 AT#wicket,1,wloop:PRINT #wicket,'*':AT #wicket,1,10-wloop:PRINT#wicket,'*'
6780 IF at_ball=0 THEN move_fielder:ELSE :throw_ball:END IF
6790 q=RND:IF run_out=1 AND wic=1 AND q<.5:c$='Run Out':AT#wicket,1,0:PRINT#wicket,'\':who:out
6791 IF run_out=1 AND wic=2 AND q<.5:c$="Run Out":AT#wicket,1,10:PRINT #wicket,'/':who:out
6795 IF run_out=1: PRINT#0,'Run Out Missed':BEEP 2000,12:PAUSE 50:CLS#0:END DEFine
6800 END IF :END IF
6810 AT#wicket,1,wloop:PRINT#wicket,' ':AT#wicket,1,10-wloop:PRINT#wicket,' '
6820 END FOR wloop
6830 END DEFine
6840 REMark ----------------------------------------------
6850 DEFine PROCedure move_fielder
6855 FILL#main,1:INK#main,4:CIRCLE #main,fx,fy,3:FILL#main,0:INK #main,2
6860 IF fx<ballx THEN fx=fx+3:IF fx>ballx THEN fx=ballx
6870 IF fx>ballx:fx=fx-3:IF fx<ballx THEN fx=ballx
6880 IF fy>bally:fy=fy-3:IF fy<bally THEN fy=bally
6890 IF fy<bally:fy=fy+3:IF fy>bally THEN fy=bally
6910 IF ballx=fx AND bally=fy THEN at_ball=1
6915 CIRCLE#main,fx,fy,2
6920 END DEFine
6930 REMark ----------------------------------------------
6940 DEFine PROCedure throw_ball
6950 IF f=0 THEN
6960 dx=60-fx:dy=54-fy:wic=1
6965 dx2=112-fx:dy2=54-fy:IF ABS(dx2+dy2) < ABS(dx+dy):dx=dx2:dy=dy2:wic=2
6970 te=RND(7 TO 10):stepx=dx/te:stepy=dy/te
6980 END IF
6985 f=1
6990 fx2=fx+stepx:fy2=fy+stepy
7000 INK#main,7:LINE#main,fx,fy TO fx2,fy2
7010 fx=fx2:fy=fy2:IF wic=1 AND fx>59 AND fx<61 AND fy>53 AND fy<55 THEN run_out=1
7011 IF wic=2 AND fx>111 AND fx<113 AND fy>53 AND fy<55 THEN run_out=1
7020 END DEFine
7030 REMark ---------------------------------------------
7040 DEFine PROCedure who
7050 IF nof=(INT(nof/2)*2) AND present_batsman=batsman1 THEN present_batsman=batsman2:RETurn
7060 IF nof=(INT(nof/2)*2) AND present_batsman=batsman2 THEN present_batsman=batsman1
7070 END DEFine
7080 REMark ---------------------------------------------
```

QL COMPETITION





QL owners have the chance to sample the squelchy world of Datalink's impressive arcade game 3-D Slime plus CAD Pak, a sophisticated icon driven graphics package.

If you've ever lamented that there were no decent games available for the QL, weep no more for 3-D Slime has slurped its way onto the software scene and with its excellent 3-dimensional graphics is in a class of its own.

As if this wasn't enough there are also copies of Datalink's CAD PAK, an easy to use icon driven graphic design utility with pull down menus and features such as spraycan, shape drawing, background washes and many more.

There are five prizes of 3-D Slime plus CAD PAK to be won in this month's competition.

How to enter

All you have to do to enter the competition is answer the simple question below.

What does the abbreviation CAD stand for?

Fill in the coupon below and send it to: 3-D Slime Competition, ZX Computing Monthly, No 1 Golden Square, London W1R 3AB. The closing date for the competition is first post on July 4, 1986. Please remember to write your answers on the back of the envelope.

The competition is open to all readers of ZX Computing except employees of Argus Specialist Publications, Datalink and Alabaster Passmore. The editor's decision is final and no correspondence can be entered into.

3-D Slime Competition Entry Form

The abbreviation CAD stands for ....

Name ....

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Complete this coupon and send it to: 3-D Slime Competition, ZX Computing Monthly, London W1R 3AB. The closing date is July 4th, 1986. Please write your answer on the back of your envelope.

QL SuperBASIC

The real power of computers rests in their ability to measure or test something, and then to react in a specific way depending upon the result. All programmers of home computers learn about the IF. . .THEN construction at an early stage; it is a vital part of every computer program — test and decide. The QL has some rather elegant extras for decision making, compared with earlier Sinclair computers. And, part three of this series is dedicated to an examination of these extras.

Those of you who started out with (or perhaps are still using) the ZX81 may recall how cumbersome the IF. . .THEN command can be with only one statement per program line. Should you require any more than one action after the THEN command, you have to GOTO or GOSUB a separate routine to execute all the actions required if the condition is satisfied. 'Spagetti' programming (a program which jumps about all over the place, and is almost impossible to follow) invariably results from this restriction, unless you are very careful.

Fig.1. 'Flipping' Coin - Demonstration of IF..THEN

```
100 REMark initialise
110 MODE 4
120 WINDOW #1,512,200,0,0
130 WINDOW #2,256,200,0,0
140 PAPER 2: INK 0: CLS
150 PAPER #2,2
160 x=0:x1=0: CSIZE 2,1
170 AT 1,24: PRINT "Heads and Tails"
180 AT 3,28: PRINT "Totals"
190 AT 5,24: PRINT "heads      tails"
200 CSIZE 0,0
210 :
220 REPeat loop
230   y= heads_or_tails
240   IF y=0 THEN x=x+1: ELSE : x1=x1+1
250   CSIZE 2,1
260   AT 6,26: PRINT x1
270   AT 6,36: PRINT x
280   CSIZE 0,0
290   IF x=20 OR x1=20 THEN EXIT loop
300   PAUSE 100
310   CLS #2
320 END REPeat loop
330 :
340 DEFine FuNction heads_or_tails
350 LOCal x,d,y
360 x=0: d=-.2
370 y= INT (RND +.5)
380 REPeat loop1
390   IF x<.1 OR x>.9 THEN d=-d
400   x=x+d: INK 0: CIRCLE 50,50,8,x,PI/2
410   IF x>.9 THEN
420      CURSOR 120,95
430      IF y=0 THEN
440         PRINT 'heads'
450      ELSE
460         PRINT 'tails'
470      END IF
480      y=y XOR 1
490   END IF
500   IF x>.9 AND RND<.1 THEN RETurn y
510   INK 2: CIRCLE 50,50,8,x,PI/2
520    IF x>.9 THEN
530      CURSOR 120,95
540      PRINT '    '
550    END IF
560 END REPeat loop1
570 END DEFine
```

The Spectrum made life a little easier; you can add several statements after the THEN command, although you could end up with a few extraordinarily long program lines which stand out like sore thumbs! But, with the QL, decisions are so much easier. Generally, you start in exactly the same way. If you are testing a variable x to be any number other than zero, then a program line to do this might look like:

1500 IF x THEN

With the QL you don't have to have anything after the THEN command. The actions on what to do if the condition is satisfied can be written as one or more normal program lines after this line. Several examples of SuperBASIC IF. . .THEN command structure appear in the listing in fig.1.

Toss up

This program provides a simulation of a spinning coin, which can land on either heads or tails. On the left of the screen will be the spinning coin, landing at random to show either face. On the right of the screen there is shown the totals of heads and tails; the program keeps on going until either total reaches 20. As there is a 50:50 chance of heads or tails, the totals should nearly always be almost equal, although they may occasionally be quite different. You may find this an interesting demonstration of probability — and animated graphics, as the illusion of a spinning coin is created on the screen. Type in the listing, then SAVE the program, and RUN it.

The 'flipping coin' listing in fig.1 contains seven IF. . .THEN structures which, between them, cover virtually all of the various ways of using this SuperBASIC command system. The structures

most familiar to BASIC programmers of the ZX81 and Spectrum appear on lines 290, 390 and 500. These have a single statement following the THEN command, and the IF. . .THEN structure is completed on one program line.

Next in complexity is the IF. . .THEN structure starting at line 520. This line just has IF (condition) THEN. By omitting any other statements after the THEN command, the QL knows that whatever commands appear on subsequent lines must be obeyed if the condition is met. In order that the QL knows which commands are to be used when the condition is met, these are 'sectioned' from the rest of the program by the END IF command. In other words, in the example, the IF. . .THEN command is on line 520, and END IF on line 550. If the condition is met (x is greater than 0.9), lines 530 and 540 are used, then the program continues with the statement after the END IF command. If the condition is not met, then the program jumps directly to the command immediately after END IF.

David Nowotnik continues his series with Part 3: What to do IF. . .THEN.

There are only two program lines between the THEN and END IF commands, but in principle you could have any number you wish as long as you remember the basic principles. To make the program easier to read, note that the commands on program lines between the THEN and END IF commands are indented, so they stand out as being a little bit different. Indentation, as we shall see later in the series, is a powerful method of emphasising structure in a program, and demonstrates another advantage of the QL over the ZX81 and Spectrum.

Separate statements

The IF. . .THEN structure on simpler versions of BASIC do not allow you to specify separate statements if the condition is not met. For example, if you have the program line:

IF X 10 THEN. . . . .

you can specify only what to do if X is greater than 10. If you also wanted to specify what to do if X is equal or less than 10, then a separate IF. . .THEN structure is required on the Spextrum and ZX81. Not so on the QL, as you have the ELSE command. Line 240 in fig.1 gives a simple example of this.

In this line, if y=0 then the statement x=x+1 is carried out. But on any occasion that y=0 is not correct, then x1=x1+1 is interpreted. The ELSE command separates what to do if the condition is met (those command(s) between the THEN and ELSE) and what to do if the condition is not met (between the ELSE and end of the IF. . .THEN structure). Normally an END IF command would be used to signify the end of the IF. . .THEN structure, but in line 240 this has been omitted as the interpreter understands that the end of this line is also the end of the IF. . .THEN structure.

A more complex example of IF. . .THEN. . .ELSE. . .END IF appears between lines 430 and 470 in fig.1. From the rules already covered, it should be obvious that line 440 is performed if the condition (x .9) is true, and line 460 is used if x is equal to or less than 0.9.

Lines 410 to 490 in fig.1 cover another principle of IF. . .THEN. Here we have an IF. . .THEN command within another IF. . .THEN. Again, indentation of program lines helps the reader to determine quite quickly which program lines belong to which structure. The IF. . .END IF between 430 and 470 lies totally within the IF. . .END IF of lines 410 and 490; in programming jargon the inner structure is said to be 'nested' within the outer IF. . .END IF. Hence the computer automatically knows that the END IF of line 470 refers to the IF. . .THEN of line 430, and that of 490 to IF. . .THEN. . .END IF structure of lines 430 to 470 will only be used if the condition of line 410 is true.

Line 480 comes between the two END IF commands, so is used by the outer structure of the two. For those unfamiliar with the XOR function, this line provides a simple way of 'switching' a variable on or off. In this line, if y starts as equal to one, the result is y=0; if y starts as zero then the result is y=1.

Absolute beginners

For those less experienced in BASIC programming, the concept of combining two or more conditions in an IF. . .THEN statement (as in lines 290, 390 and 500 of fig.1) might be a little confusing. In fact it is quite straightforward with two conditions, and, once you are familiar with the rules, more conditions can be joined. The joining words are AND and OR.

Lines 290 and 390 link two conditions with the OR function. In line 290 if either x=20 or x1=20, then the overall condition is met, and the command after THEN (EXIT) is enacted. In the same way, line 390, if either x 0.1 or x 0.9 is correct, then the conversion d=−d is carried out. In line 500 *both* x 0.9 and RND 0.1 have to be true in order that, in this case, the

Fig.2. Driving Test Game - Demonstration of SELect

```
100 REMark    Driving Test
110 :
120 REMark initialise
130 MODE 4
140 WINDOW 472,160,20,20
150 WINDOW #2,512,200,0,0
160 PAPER 0: INK 2
170 PAPER #2, 2: INK #2, 7
180 CLS #2: CLS
190 CSIZE #2,2,1
200 AT #2,0,14: PRINT #2,"Driving Test"
210 CSIZE #2,0,0
220 AT #2,19,15: PRINT #2,"Points = 0"
230 AT #2,19,30: PRINT #2,"Time = 0      Speed = 4"
240 FOR i=30 TO 420 STEP 60
250   FOR j=10 TO 140 STEP 40
260      BLOCK 40,20,i,j, 1+RND (1 TO 5)
```

▶

```
270   END FOR j
280 END FOR i
290 dr=4: speed=4
300 posx=10: posy=10
310 PAUSE 200: BEEP 2000,100
320 BLOCK 5,5,10,10,7: PAUSE 50
330 ADATE (-DATE): time=0
340 points=0
350 :
360 REMark Main routine
370 REPeat loop
380   BLOCK 5,5,posx,posy,0
390   steer: move_car (dr)
400   IF impact THEN EXIT loop
410   BEEP 2000,200-speed*5
420   BLOCK 5,5,posx,posy,7
430   IF DATE-20*time>20 THEN
440      sr: time=time+1
450      speed=speed+1
460      AT #2,19,52: PRINT #2, speed
470      END IF
480   END IF
490 AT #2,19,37: PRINT #2, DATE
500 END REPeat loop
510 CSIZE 2,1: INK 7
520 AT 3,16: PRINT "Game Over": INK 5
530 AT 5,12: PRINT "Try again? (y/n)"
540 REPeat yes_or_no
550   x$= INKEY$(-1)
560   IF x$="y" THEN RUN
570   IF x$="n" THEN CLS: STOP
580 END REPeat yes_or_no
590 :
600 DEFine PROCedure steer
610 LOCal x,x$,y
620 x$= INKEY$(0)
630 x= CODE (x$)
640 SELect ON x
650   =192,193,194,196: y=1
660   =200,201,202,204: y=2
670   =208,209,210,212: y=3
680   =216,217,218,220: y=4
690   =REMAINDER : y=dr
700 END SELect
710 IF y<>dr THEN
720   IF (y=1 OR y=2) AND (dr=3 OR dr=4) THEN sr
730   IF (y=3 OR y=4) AND (dr=1 OR dr=2) THEN sr
740 END IF
750 dr=y
760 END DEFine steer
770 :
780 DEFine PROCedure sr
790 points=points+1
800 AT #2,19,24: PRINT #2, points
810 END DEFine sr
820 :
830 DEFine PROCedure move_car (dr)
840 y=dr
850 SELect ON y
860   =1: posx=posx-speed*2
870   =2: posx=posx+speed*2
880   =3: posy=posy-speed
890   =4: posy=posy+speed
900 END SELect
910 END DEFine move_car
920 :
930 DEFine FuNction impact
940 LOCal x,y,z
950 z=0
960 IF posx<0 THEN z=1
970 IF posy<0 THEN z=1
980 IF posx>467 THEN z=1
990 IF posy>155 THEN z=1
1000 x=posx-8-60*INT ((posx-8)/60): y=posy-40*INT
(posy/40)
1010 IF posx< 20 OR posx>400 THEN x=10
1020 IF x>17 AND (y>5 AND y<29) THEN z=1
1030 IF z=1 THEN
1040    BEEP
1050    BEEP 20000,24,145,5,15,-6,15,1648
1060 END IF
1070 RETurn z
1080 END DEFine impact
```

RETurn command is used. There are other, more complex, examples of linking conditions with AND and/or OR in the listing in fig.2. See if you can work out their logic.

The QL offers another decision-making structure which, again, overcomes some of the untidy programming necessary with the Spectrum and ZX81. Suppose we wanted to carry out a number of different actions depending on the value of a variable, x. For example, if x equals 1,2,5,7, or 9 we wanted to do one thing, x=3,4,6,10 do something else, x=8,14,15 a third series of actions, and if x is anything else a fourth set of instructions. With the ZX81 and Spectrum we'd use a whole series of large IF. . .THEN commands. But with the QL there is the elegant SELect command. The listing in fig.2 was written to provide an example of SELect.

Playtime

The listing in fig.2 is a simple game. Type in the listing, SAVE and RUN it. Using the cursor keys (or a joystick connected to CTRL 1) the object is to guide a 'car' (the small white moving box which starts at the top left of the screen) around the streets of an American-style city made up of blocks of buildings. Avoid the buildings and edge of the playing area. Every 20 seconds the car travels a little faster. You get some points for the amount of time you last, but high scores can only be obtained with frequent left and right turns.

In pressing any one of the cursor keys, program lines 620 and 630 obtain the numeric CODE value of that keypress. To decide on what action to take (change of direction), the SELect command structure is used, in lines 640 to 700. As, in theory, the cursor keys could be pressed alone, or in combination with either the shift, CTRL, or ALT keys (each combination producing a different CODE value) then every possible value should be considered.

The SELect command starts with the line SELect ON, then the variable in question (in line 640, this is 'x'). The SELect structure ends with END SELect (line 700).

Everything in between these two lines tests the value of x, and, once a match is found, presents (in this case) one statement to be evaluated. So, in line 650, if x is equal to 192,193, 194, or 196 then the command y=1 is enacted. These values are CODE numbers of the left cursor key alone, and in combination with ALT, CTRL and shift, respectively. Once selected, the program automatically jumps to the END SELect command; no value can be selected twice in a single SELect structure.

Lines 650 to 680 present 16 possible values of x. If no match is found with any of these, then the REMAINDER command picks this up in line 690. The instruction y=dr in line 690 will be used if x is not equal to any of the 16 values presented on the previous four program lines. This example, and that in lines 850 to 900, present the simplest forms of the SELect command. For a more complex example take a look at lines 2000 to 2050 in fig.3. Here we have SELect on z1; in line 2010 a range of possible values of z1 is given (97 TO 112). If any value in this range matches z1 then the command after the colon in line 2010 is enacted.

Fig.3. More lines for the Keyboard Trainer Program

```
300 k: start
310 PRINT #0\\\"    Please wait - initialising arrays"
320 init: first_message
330 REPeat main_loop
340   start: menu
350 END REPeat main_loop
360 :
370 :
380 DEFine PROCedure start
390 WINDOW #0,512,52,0,204
400 BORDER #0,4,250
410 INK #0,7: PAPER #0,0: CLS #0
420 CSIZE #2,3,1
430 AT #2,0,0: PRINT #2\,"KEYBOARD TRAINER"
440 END DEFine start
450 REMark ********************
460 DEFine PROCedure first_message
470 LOCal a$: CSIZE #0,0,0
480 PRINT #0\\"    So, you want to learn to type?"\" Well,
this is just the program to help!"
490 INK #0,2: PRINT #0,"                PRESS ANY KEY"
500 INK #0,7: a$=INKEY$(-1)
510 END DEFine first_message
520 REMark ********************
530 DEFine PROCedure menu
540 LOCal a,a$: CLS: CSIZE 1,1: INK 2
550 PRINT" Select one of these:-"
560 CSIZE 0,0: INK 7
570 PRINT\\"  1. Demonstration"
580 PRINT"  2. Find the keys"
590 PRINT"  3. Upper and lower case"
600 INK 2: PRINT \"            Press 1 to 3"
610 REPeat loop
620   a$= INKEY$ (-1)
630   IF a$>"0" AND a$<"4" THEN EXIT loop
640 END REPeat loop
650 a=a$
660 k: start
670 SELect ON a
680   =1: option_1
690   =2: option_2
700   =3: option_3
710 END SELect
720 END DEFine menu
730 REMark ********************
740 DEFine FuNction any_key (i,p,delay)
750 LOCal z,a$,j
760 REPeat jj: IF INKEY$ (0)="" THEN EXIT jj: END REPeat jj
770 a$=INKEY$ (5): z=0
780 IF NOT a$="" THEN
790   z=CODE (a$): which_key z,i,p,delay
800   RETurn z
810 END IF
820 IF KEYROW (7)=4 THEN z=110
830 IF KEYROW (7)=2 THEN z=109
840 IF KEYROW (5)=8 THEN z=103
850 IF KEYROW (3)=2 THEN z=104
860 IF z=0 THEN RETurn z
870 key_colour z,i,p
880 FOR j=1 TO delay*10: END FOR j
890 key_colour z,7,0
900 RETurn z+200
910 END DEFine any_key
920 REMark ********************
930 DEFine PROCedure option_1
940 LOCal z,a$: upper_case
950 PRINT #0\\" Press a few keys, and watch the screen."\\"
Press the 'ESC' key to stop."
960 REPeat op_1_loop
970   z=any_key (2,5,10)
980   IF z=27 OR z=127 THEN EXIT op_1_loop
990 END REPeat op_1_loop
1000 CLS #0
1010 s_print "  No doubt you saw what was happening!"
1020 s_print " As you pressed a key, the same key was"
1030 s_print "   highlighted on the screen keyboard."
1040 s_print " This program uses this feature to help"
1050 s_print " you to find keys, and show you how to"
1060 s_print "          to use the keyboard."
1070 INK #0,2: s_print "  Press any key to return to the
menu.": INK #0,7
1080 a$= INKEY$ (-1)
1090 END DEFine option_1
1100 REMark ********************
1110 DEFine PROCedure s_print (a$)
1120 LOCal i,j
1130 FOR i=1 TO 500: END FOR i
1140 FOR j=1 TO LEN (a$)
1150   PRINT #0,a$(j);
1160   FOR i=1 TO 20: END FOR i
1170 END FOR j
1180 FOR i=1 TO 500: END FOR i: PRINT #0
1190 END DEFine s_print
1200 REMark ********************
1210 DEFine PROCedure option_2
1220 LOCal z,i,a$
1230 upper_case: INK #0,3
1240 s_print "               FIND A KEY": INK #0,7
1250 PRINT #0: s_print " To the beginner, all the keys appear
to"
1260 s_print " be in strange order. But the 'QWERTY'"
1270 FOR i=50,56,38,51,53,58
1280   key_colour i,2,6
1290 END FOR i
1300 s_print "keyboard was designed to make typing easy"
1310 s_print " All you have to do is memorise all the"
1320 s_print " key positions until it becomes automatic"
1330 s_print " to think of a key, and press that key."
1340 s_print "   For now, we won't worry about which"
1350 s_print " finger to use, or about capital letters."
1360 s_print "    In fact, imagine the keyboard just"
1370 s_print "   gave you small (lower case) letters!"
1380 FOR i=1 TO 2000: END FOR i
1390 k: start
1400 FOR i=66 TO 91
1410   CURSOR a%(i,5),a%(i,6)
1420   PRINT CHR$ (i+31)
1430 END FOR i
1440 s_print "  We'll practise using just these keys."
1450 s_print " I'll ask you for a key, then you find it"
1460 s_print "  and press that key. I'll tell you how"
1470 s_print "    long it took you to find the key."
1480 s_print " The only key we'll be using which isn't"
1490 s_print "  marked is the SPACE bar...."
1500 FOR i=1 TO 500: END FOR i
1510 which_key 32,2,6,200
1520 REPeat loop_2_1
1530   FOR j=1 TO 10
1540   POKE_W 163976,0
1550   IF RND < 3E-2 THEN
1560     find_a_key 32,32
1570   ELSE
1580     find_a_key 97,122
1590   END IF
1600   NEXT j
1610   IF NOT more THEN EXIT loop_2_1
1620 END REPeat loop_2_1
1630 END DEFine option_2
1640 REMark ********************
1650 DEFine PROCedure find_a_key (low,high)
```

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```
1660 LOCal z,corr, z1,time,n$,y
1670 CLS #0: INK #0,5
1680 PRINT #0: s_print "   OK.... find for me...."
1690 INK #0,7: PRINT #0
1700 z= RND (low TO high)
1710 PRINT #0,"   The "; CHR$ (z);" key."
1720 ADATE (-DATE): corr=0
1730 REPeat lp1
1740   REPeat lp2
1750     z1= any_key (2,6,100)
1760     IF z1 THEN EXIT lp2: END IF
1770     IF DATE >20 THEN EXIT lp1: END IF
1780   END REPeat lp2
1790   IF z=z1 THEN corr=1
1800   IF corr THEN
1810      time= DATE
1820      s_print "   That's right!"
1830      which_key z,2,5,100
1840      n$="    You took "&time&" seconds": s_print n$
1850      FOR i=1 TO 2000: END FOR i
1860      ELSE
1870      s_print "  That's not right! I'll show you "; CHR$
(z)
1880      which_key z,2,5,200
1890   END IF
1900 EXIT lp1
1910 END REPeat lp1
1920 IF z1=0 THEN
1930   s_print " Not fast enough! - Here it is..."
1940   which_key z,2,5,200
1950 END IF
1960 y=low
1970 SELect ON y
1980   =97: key_colour z-31,7,0
1990   IF NOT corr THEN
2000     SELect ON z1
2010        =97 TO 112: key_colour trans (z1),7,0
2020        =65 TO 90: key_colour trans (z1)+32,7,0
2030        key_colour 105,0,0: key_colour 106,0,0
2040        = REMAINDER : key_colour trans (z1),0,0
2050     END SELect
2060    END IF
2070    =REMAINDER : IF NOT corr THEN which_key z1,7,0,10
2080 END SELect
2090 END DEFine find_a_key
2100 REMark ********************
2110 DEFine FuNction more
2120 LOCal a$
2130 CLS #0: PRINT #0
2140 s_print " Want another 10 letters? (y/n)"
2150 REPeat mr
2160   a$= INKEY$ (-1)
2170   IF a$="y" OR a$="n" THEN EXIT mr
2180 END REPeat mr
2190 IF a$='y' THEN RETurn 1: ELSE RETurn 0: END IF
2200 END DEFine more
2210 REMark ********************
2220 DEFine FuNction trans (z)
2230 LOCal y,x
2240 y=z: x=0
2250 SELect ON y
2260  =32 TO 127: x=y-31
2270  =232,234: x=97
2280  =236,238: x=98
2290  =240,242: x=99
2300  =244,246: x=100
2310  =27,127: x=101
2320  =9,253: x=102
2330  =10,254: x=107
2340  =300 TO 400: x=y-200
2350 END SELect
2360 RETurn x
2370 END DEFine trans
2380 REMark ********************
2390 DEFine PROCedure option_3
2400 LOCal j
2410 upper_case: INK #0,3
2420 s_print "      FIND A KEY - UPPER AND LOWER CASE"
2430 INK #0,7: PRINT #0
2440 s_print " If you've practised the lower case keys"
2450 s_print "   and you are getting quite good at "
2460 s_print "finding all of them, then now is the time"
2470 s_print " to try both upper and lower case. To get"
2480 s_print " upper case (capital) letters, you have"
2490 s_print " press one of the shift keys at the same"
2500 s_print " time as you press the required letter."
2510 key_colour 105,5,2: key_colour 106,5,2
2520 s_print " These are the shift keys."
2530 PAUSE 200: key_colour 105,7,0: key_colour 106,7,0
2540 s_print " The keyboard on the screen may not show"
2550 s_print " you the same SHIFT key as the one you"
2560 s_print " pressed, but it is the one you should"
2570 s_print " press. See if you can recognise the"
2580 s_print " pattern."
2590 s_print " Here we go.....": PAUSE 200
2600 REPeat loop_3_1
2610   FOR j=1 TO 10
2620     POKE_W 163976,0
2630     IF RND<.5 THEN
2640        find_a_key 98,122
2650     ELSE
2660        find_a_key 65,90
2670     END IF
2680   END FOR j
2690   IF NOT more THEN EXIT loop_3_1
2700 END REPeat loop_3_1
2710 END DEFine option_3
```

In line 2020, another range of possible values of z1 is given. Note now that there are three statements which are employed if z1 matches one of the numbers in this range, and these instructions extend over two program lines. Like the IF. . .THEN structure, the QL allows virtually any number of program lines to be associated with one selection; each selection is clearly separated, as each will start with '=. . .(list of values)' or '(variable)=. . .(list of values)'.

SELect structures can be nested with other SELects, or with IF. . .THEN commands. Lines 1970 to 2080 in fig.3. gives an example of this, with, of course, indenting to help you connect the various parts. You can mix individual numbers with ranges in making the selection; for example the structure:

SELect on x
x=2,3,10 to 20,25,30

is perfectly valid.

Different ROMS

In writing these examples, an interesting difference between the 'JM' and 'JS' versions of the QL was noted. In defining a procedure, a variable can be passed to that procedure. For example, line 830 in fig.2. accepts one number assigned to the local variable 'dr'. If in line 850, the command read 'SELect on dr', the program would work on the 'JM' version, but not on the 'JS' QL. Select will not work on a variable directly passed to a defined procedure or function with the 'JS' ROM QL. To work on both versions, line 840 was introduced.

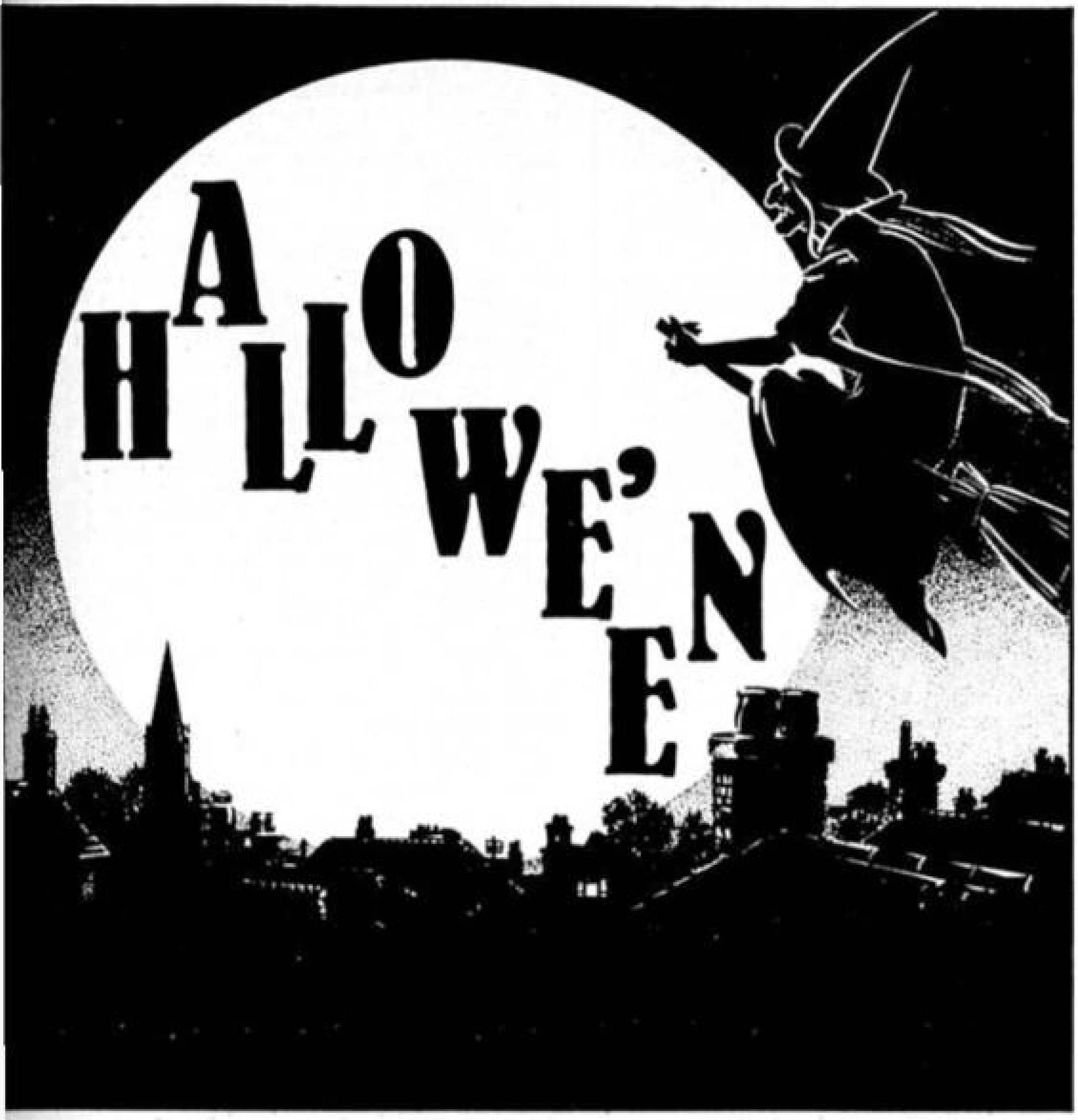
Keyboard trainer

Last month, the introductory part of a keyboard trainer program was presented as a listing. The second part of that program appears in fig.3. Type in the listing, then SAVE it. LOAD last month's program, then MERGE the program lines of fig.3. When the program is RUN, all instructions appear on the screen. You then will have a fairly basic keyboard trainer, which can be expanded readily using the extensive command set created by the procedures and functions of this program.

And finally, on the questions posed by the speed programs last month. If you recall, they tested whether SuperBASIC programs slowed down as the program length increased, and looked at the effect of having procedures at the beginning or end of programs.

You should have found that the running speed of SuperBASIC gets slower as a program gets longer, but the position of a defined procedure does not effect the speed (two things to bear in mind when writing your own programs).

In the next part of this series, we'll be taking a look at some of the QL's impressive graphics capabilities.



By Derek Mearns

Old Witchypoo's gone and gotten herself trapped in the haunted tower. It's up to you to guide her through all seven levels and help her escape. All you need are nimble fingers and a Spectrum.

D.I.Y.

Hee-hee. Hello kids, it's Witchypoo here with a seasonal Halloween game for you. It's a fear-filled treat ... Eh? You say it's not Halloween yet? Then ... whaaaaugh! (Shut up you old crone and get back in the closet for a few months. Sorry about that. We know it's not Halloween yet, but this game was just too good to keep under our little pointy hats until then — Ed.)

Just type the programme in and save it with the command **SAVE "Halloween" Line 10**. It's best to save a copy of the game onto tape before running it just in case you've got to correct any errors. Then use **LOAD ""** to load the game and it will autorun on loading. Full instructions are included in the game.

Listing 1

```
  10 REM INITIALISE SCREEN
  12 RESTORE
  15 POKE 23658,8
  20 PAPER 0: BORDER 0: INK 3: F
LASH 0: BRIGHT 0: OVER 0: INVERS
E 0: CLS : BRIGHT 1
  30 PRINT AT 0,0; PAPER 1; INK
5;"

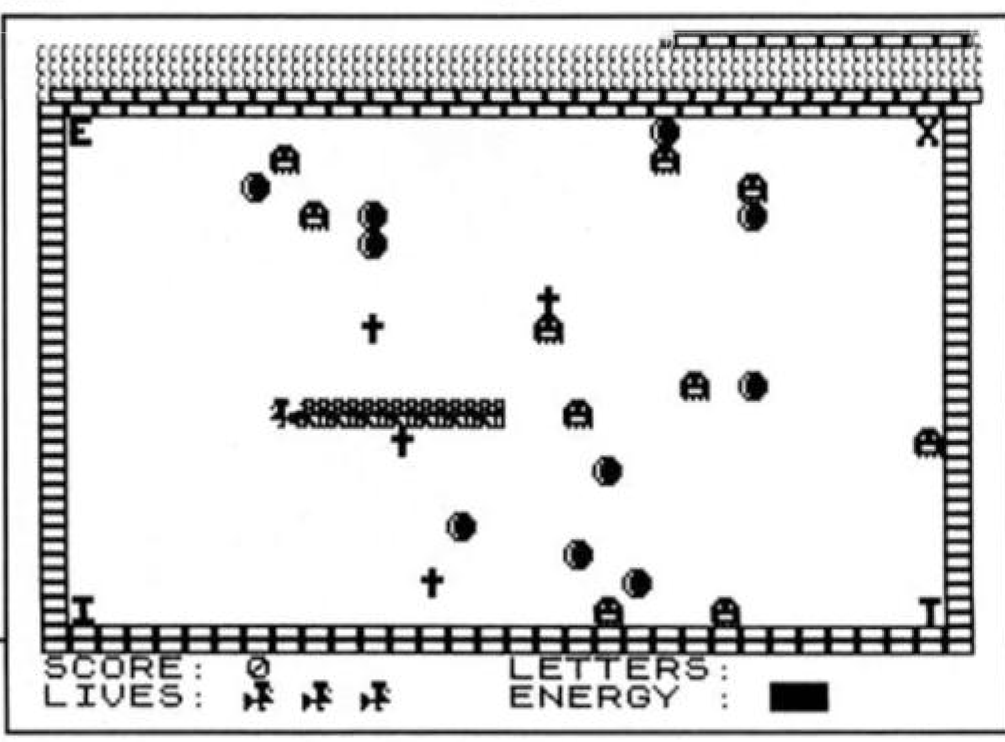



      HALLOWE'EN - BY DEREK ME
ARNS
```

Listing 2

```
"
 110 FOR f=144 TO 154: FOR g=0 T
O 7: READ a: POKE USR CHR$ f+g,a
: NEXT g: NEXT f
 120 DATA 255,129,129,255,255,12
9,129,255
 130 DATA 30,30,13,140,206,255,2
00,140,120,120,176,49,119,255,23
,49
 140 DATA 60,94,191,191,191,191,
94,60,136,34,136,32,0,26,138,32
 150 DATA 24,24,126,126,24,24,24
,24,60,126,219,255,255,195,255,8
5
 160 DATA 126,126,96,120,120,96,
126,126,102,102,60,24,24,60,102,
102,126,126,24,24,24,24,126,126,
126,126,24,24,24,24,24,24
 170 DIM a$(480): PRINT AT 11,0;
 INK 6;"DO YOU WANT INSTUCTIONS
(Y/N) ?"
 171 IF INKEY$="Y" THEN  GO TO 1
71
 173 IF INKEY$="Y" THEN  GO SUB
8000: PRINT AT 6,0;a$,,: GO TO 1
70
 176 IF INKEY$="N" THEN  GO TO 1
90
 180 GO TO 173
 200 REM INITIALISE VARIABLES
 205 LET hs=0: LET h$=""
 210 LET s=1
 220 RESTORE 220: DIM i(2): LET
i(1)=6: LET i(2)=5: LET o$="
"
 230x(9): DIM y(9): FOR f=1 TO 9
: READ y(f),x(f): NEXT f: DATA 1
,2,1,29,2,1,2,30,17,1,17,30,18,2
,18,29,11,15
 232 PRINT AT 11,0; INK 6;"PRESS
 SKILL LEVEL 1 TO 9",''"(1-SNAIL
 PACE","9-IMPOSSIBLE)"
 235 LET r$=INKEY$: IF r$<"1" OR
 r$>"9" THEN  GO TO 235
 238 LET sk1=VAL r$: LET sk=26-(
sk1*3-2)
 239 PRINT AT 11,0,,,,,,
 240 LET e=6.99: LET l=3: LET sc
=0: LET c=0: DIM c(4)
 298 LET d=1: LET w$=" "
 299 GO SUB 9000
 300 REM PRINT OBJECTS
 302 PRINT AT 11,15; INK 4;w$
 303 LET l$="    ": FOR f=1
TO 4: IF c(f)=1 THEN  PRINT AT 2
0,f+24; INK 4;l$(f)
 304 NEXT f
 305 IF c(1)=0 THEN  PRINT AT 1,
```

▶ ▶ ▶



```
▶ ▶ ▶1; INK 4;" "
 306 IF c(2)=0 THEN  PRINT AT 1,
30; INK 4;" "
 307 IF c(3)=0 THEN  PRINT AT 18
,1; INK 4;" "
 308 IF c(4)=0 THEN  PRINT AT 18
,30; INK 4;" "
 315 FOR f=1 TO 10: FOR g=1 TO 2
 320 LET x=INT (RND*30)+1: LET y
=INT (RND*18)+1: IF ATTR (y,x)<>
3 THEN  GO TO 320
 325 FOR h=1 TO 9: IF x=x(h) AND
 y=y(h) THEN  GO TO 320
 326 NEXT h
 330 PRINT AT y,x; INK i(g);o$(g
): NEXT g: NEXT f
 340 FOR f=1 TO 4
 350 LET x=INT (RND*30)+1: LET y
=INT (RND*18)+1: IF ATTR (y,x)<>
3 THEN  GO TO 350
 355 FOR h=1 TO 8: IF x=x(h) AND
 y=y(h) THEN  GO TO 350
 356 NEXT h
 360 PRINT AT y,x; INK 2;" ": N
EXT f
 390 GO SUB 400: GO TO 420
 400 REM STATUS DISPLAY
 410 PRINT AT 20,0; INK 7;"SCORE
: ";sc,"LETTERS:"'"LIVES:": FOR
f=1 TO l: PRINT AT 21,f*2+5; INK
 4;" ": NEXT f: PRINT AT 21,16;
 INK 7;"ENERGY : "; INK INT e;"
 "
 415 RETURN
 420 LET x=15: LET y=11
 490 PRINT AT y,x; BRIGHT 0;" "
 500 REM WITCH MOVEMENT
 505 IF ATTR (y,x)<>3 THEN  GO T
O 1000
 510 PRINT AT y,x; INK 4;w$: LET
 e=e-.04: IF e<=0 THEN  LET r=4:
 GO TO 1500
 515 PRINT AT 21,25; INK INT e;"
 "
 517 FOR f=1 TO sk: NEXT f
 518 LET r$=INKEY$: IF r$="M" TH
EN  PAUSE 1: PAUSE 0: GO TO 518
 520 PRINT AT Y,X; INVERSE 1; PA
PER 3; INK 0;" ": IF r$="O" THE
N  GO TO 600
 530 IF r$="A" THEN  GO TO 700
 540 IF r$="Q" THEN  GO TO 800
 550 IF r$="P" THEN  GO TO 900
 560 GO TO d*100+500
 600 LET w$=" ": LET x=x-1: LET
 d=1: GO TO 505
 700 LET y=y+1: LET d=2: GO TO 5
05
 800 LET y=y-1: LET d=3: GO TO 5
05
 900 LET w$=" ": LET x=x+1: LET
 d=4: GO TO 505
1000 REM INTO OBJECT
1005 IF ATTR (y,x)=88 THEN  LET
r=1: GO TO 1500
1010 IF ATTR (y,x)=69 THEN  LET
r=2: GO TO 1500
1020 IF ATTR (y,x)=66 THEN  BRIG
HT 0: CLS : BRIGHT 1: PRINT AT 6
,1; INK 6;"YOU COLLIDED WITH A G
RAVESTONE";AT 12,4;"YOU LOSE ALL
 YOUR LIVES": PAUSE 100: GO TO 1
520
1030 IF ATTR (y,x)=67 THEN  LET
r=3: GO TO 1500
1040 IF ATTR (y,x)=70 THEN  LET
e=e+.5: BEEP .5,20: PRINT AT y,x
; BRIGHT 0;" ": IF e>9.99 THEN
LET e=9.99
1060 IF y=1 AND x=1 THEN  LET c(
1)=1: PRINT AT 20,25; INK 4;" "
: GO SUB 1200
1070 IF y=1 AND x=30 THEN  LET c
(2)=1: PRINT AT 20,26; INK 4;"
": GO SUB 1200
1080 IF y=18 AND x=1 THEN  LET c
(3)=1: PRINT AT 20,27; INK 4;"
": GO SUB 1200
1090 IF y=18 AND x=30 THEN  LET
c(4)=1: PRINT AT 20,28; INK 4;"
 ": GO SUB 1200
1100 IF c=4 THEN  GO TO 2000
1110 GO TO 506
1200 REM LETTER COLLECTED
1210 LET c=c+1: LET sc=sc+10*s*s
k1: PRINT AT 20,7; INK 7;sc: PRI
NT AT y,x; INK 4;w$: FOR f=20 TO
 30: BEEP .1,f: NEXT f: RETURN
1500 REM DEATH ROUTINE
1510 LET l=l-1: FOR f=10 TO 0 ST
EP -1: BEEP .1,f: NEXT f: CLS
1511 IF r=1 THEN  PRINT AT 7,0;
INK 6;"YOU COLLIDED WITH YOUR OW
N TRAIL"
1512 IF r=2 THEN  PRINT AT 7,3;
INK 6;"YOU COLLIDED WITH A GHOST
"
1513 IF r=3 THEN  PRINT AT 7,3;
INK 6;"YOU COLLIDED WITH THE WAL
L"
1514 IF r=4 THEN  PRINT AT 7,5;
INK 6;"YOU RAN OUT OF ENERGY"
1515 PRINT AT 14,0; INK 6;"YOU L
OSE A LIFE - ";l;" LIVES LEFT"
1516 IF l=1 THEN  PRINT AT 14,20
; INK 6;"LIFE LEFT "
1517 LET e=7.99-s
1518 PAUSE 100: PRINT AT 11,0,,:
 IF l>0 THEN  GO TO 290
1520 CLS : PRINT AT 0,11; INK 6;
"GAME OVER";AT 4,0;"YOU WERE ON
SKILL LEVEL ";sk1;AT 8,0;"YOU RE
ACHED STAGE ";s;AT 12,0;"YOU HAD
 A SCORE OF ";sc
1530 IF sc>hs THEN  PRINT AT 16,
0; INK 6;"YOU HAVE BEATEN THE HI
GH SCORE. PLEASE TYPE IN YOUR NA
ME.": INPUT  LINE h$: LET hs=sc:
 GO TO 1600
1540 PRINT AT 16,0; INK 6;"THE H
IGH SCORE REMAINS ";hs,"BY ";h$
1600 REM ANOTHER GAME
1610 POKE 23658,8: PAUSE 200: CL
S : PRINT AT 11,0; INK 6;"PRESS
ANY KEY FOR ANOTHER GAME": PAUSE
 0: GO TO 210
2000 REM STAGE COMPLETED
2010 CLS : PRINT AT 11,7; INK 6;
"STAGE ";s;" COMPLETED": LET s=s
+1: PAUSE 100: LET c=0: DIM c(4)
: IF s<8 THEN  GO TO 290
2020 CLS : PRINT AT 0,11; INK 6;
"CONGRATULATIONS - GAME COMPLETE
D";AT 4,0;"YOU DID THIS ON SKILL
 LEVEL ";sk1;AT 8,0;"YOU HAD ";l
;" LIVES LEFT";AT 12,0;"YOU HAD
A SCORE OF ";sc
2030 GO TO 1530
8000 REM INSTTRUCTIONS
8010 PAUSE 1: PRINT AT 6,0; INK
6;"YOU PLAY THE PART OF A WITCH
ON HER MOTORISED BROOMSTICK,
   TRAPPED IN A SEVEN FLOOR CAST
LE."''"YOU HAVE TO WORK YOUR WAY
 UP THECASTLE TO THE TOP (LEVEL
7)     WHERE, ON ESCAPING YOU WI
LL BE  ABLE TO FLY AWAY."''"TO E
SCAPE FROM EACH LEVEL YOU   MUST
 COLLECT THE LETTERS IN EACH"
8020 PRINT  INK 6;"CORNER OF THE
 ROOMS TO SPELL THEWORD·EXIT.YOU
 WILL THEN AUTOMAT-ICALLY BE TRA
NSPORTED TO THE    NEXT LEVEL."
8030 PRINT AT 21,9; INK 5;"PRESS
 ANY KEY": PAUSE 0: PRINT AT 6,0
;a$:
8040 PRINT AT 6,0; INK 6;"HOWEVE
R, GHOSTS INHABIT EACH    LEVEL
AND SHOULD YOU COLLIDE    WITH O
NE OF THEM YOU LOSE A     LIFE.
LIVES ARE ALSO LOST BY    FLYING
 INTO THE WALLS OR BACK ONYOUR O
WN TRAIL OF POISENOUS     FUMES
GIVEN OFF BY YOUR BROOM-  STICK.
"
8050 PRINT ' INK 6;"THERE ARE AL
SO GRAVESTONES ON   EACH LEVEL.
THESE, ON COLLISION,WILL CAUSE L
OSS OF ALL YOUR     REMAINING LI
VES.": PAUSE 0: PRINT AT 6,0;a$;
AT 6,0; INK 6;"YOUR ENERGY SUPPL
Y MUST ALSO BE WATCHED. THE LOWE
R THE VALUE"
8060 PRINT  INK 6;"THAT THE COLO
UR HAS ON THE        COMPUTER, THE
 LOWER YOUR ENERGY.THAT IS, BLAC
K IS MINIMUM AND    WHITE MAXIMUM
 ENERGY. YOUR        ENERGY INCREA
SES SLIGHTLY WHEN   YOU EAT ONE O
F THE PUMPKINS."
8065 PRINT ' INK 6;"WHEN YOU LOS
E A LIFE, THE AMOUNTOF ENERGY YO
U HAVE LEFT IS AUTO-MATICALLY AD
JUSTED UP OR DOWN TOTHE AMOUNT R
EQUIRED TO COMPLETE THE GAME."
8070 PAUSE 0: PRINT AT 6,0;a$
8080 PRINT AT 6,0; INK 4;"
"; INK 6;"THE WITCH (YOU)."'' IN
K 4;"      "; INK 6;"THE LETT
ERS TO COLLECT."'' INK 3;"
 "; INK 6;"THE CASTLE WALLS."''
INK 3;"      "; INK 6;"YOUR OWN
 TRAIL."
8090 PRINT ' INK 2;"     "; INK
 6;"THE GRAVESTONES."'' INK 5;"
     "; INK 6;"THE GHOSTS."''"
    THE PUMPKINS."
8100 PAUSE 0: PRINT AT 6,0;a$;AT
 6,0; INK 6;"YOU SCORE FOR EACH
LETER COLLEC-TED. THE AMOUNT PER
 LETTER IS 10x THE STAGE NUMBER
x THE SKILL  LEVEL."
8110 PRINT  INK 6''"THE KEYS TO
USE ARE:"'' INK 7;"Q   UP","A
DOWN"''"O   LEFT","P   RIGHT"''"
M   PAUSE-ANY OTHER KEY RESTARTS
"
8120 PAUSE 0: RETURN
9000 REM PRINT CASTLE
9005 BRIGHT 0: CLS : BRIGHT 1
9007 PRINT AT 9,12; INK 6;"STAGE
 ";s: GO SUB 400: PAUSE 100: PRI
NT AT 9,0; BRIGHT 0,,
9010 FOR f=0 TO 19 STEP 19: PRIN
T AT f,0;"


     ": NEXT f: FOR f=0 TO
19: PRINT AT f,0;" ";AT f,31;"
 ": NEXT f: IF s=1 THEN  RETURN
9020 FOR g=1 TO 13 STEP 12: FOR
f=g TO g+5: PRINT AT f,15;"  "
: NEXT f: NEXT g: IF s=2 THEN  R
ETURN
9030 FOR h=7 TO 23 STEP 16: FOR
f=7 TO 12: PRINT AT f,h;"  ":
NEXT f: FOR g=1 TO 17 STEP 16: F
OR f=0 TO 1: PRINT AT g+f,h;"
 ": NEXT f: NEXT g: NEXT h: IF s
=3 THEN  RETURN
9040 FOR g=9 TO 10: FOR f=1 TO 2
5 STEP 24: PRINT AT g,f;"  ";
BRIGHT 0;"  "; BRIGHT 1;"  ":
NEXT f: NEXT g: IF s=4 THEN  RET
URN
9050 FOR g=3 TO 15 STEP 12: FOR
f=0 TO 1: PRINT AT g+f,11;"
       ": NEXT f: NEXT g
: FOR h=5 TO 11 STEP 6:: FOR g=1
1 TO 19 STEP 8: FOR f=0 TO 3: PR
INT AT f+h,g;"  ": NEXT f: NEX
T g: NEXT h: IF s=5 THEN  RETURN
9060 FOR h=3 TO 13 STEP 10: FOR
g=3 TO 27 STEP 24: FOR f=0 TO 3:
 PRINT AT h+f,g;"  " : NEXT f:
 NEXT g:  NEXT h: IF s=6 THEN  R
ETURN
9070 FOR h=3 TO 13 STEP 10: FOR
g=0 TO 3 STEP 3: FOR f=7 TO 23 S
TEP 16: PRINT AT h+g,f;"  ": N
EXT f: NEXT g: NEXT h: FOR f=9 T
O 10: PRINT AT f,15;"  ": NEXT
 f: RETURN
```



Ray Elder mans the last outpost of the ZX81.

We start this month with an apology. I tried to get so much in the last issue I left a few things not properly explained, all the actual code in last issue's program works, but the loader program has a few hiccoughs.

First, ignore the report **3/60**. Although the program crashes, the code *has* loaded OK. Secondly the REM expander may appear not to have worked but it has! Try moving the cursor to the second line and you'll find the ZX81 skips over it. It has actually become part of the first line.

The most serious bit was the loader line LET A$=A$(2 TO), the more knowledgeable among you will ahve correctly spotted that it should be LET A$=A$(3 TO). Sackcloth and ashes time again...

Once more...

This month, as promised, I have got four scrolling routines to be added to your REM collectiion, and I've modified the little loader program to be less confusing for new readers.

You can of course use each routine independently and for the benefit of Absolute Beginners the method of entry is as follows.
1. Type in the loader program
2. ADD a line 1 **REM** followed by at least 190 characters.
3. Type in the routines by adding and changing line 10

When you run the program it will ask for an address to load the code to. The suggested addresses are given with each routine but each routine is relocatable and can be put at any convenient address.

Finally, followers of this series ought really to add info REMs to the program to show all the routines so far, they can be removed from any final program and they are more reliable than the best memory and less likely to get lost than the best list on paper!
e.g.

```
4 REM 16514=REM EXPANDER
      16550=SCREEN INVERT
      16575=SCROLL DOWN
      16610=SCROLL UP
      16640=SCROLL LEFT
      16675=SCROLL RIGHT
```

Some may well ask why we need a routine to scroll up when there is already a built in command SCROLL. Well, the ZX81 scroll is designed to operate in 1K mode and can severely disrupt the display file. While the '81 can cope with it without problems, if you try to use any of our other screen routines then the machine will become totally confused and go away and sulk! The routine given keeps the display file intact.

```
LOADER PROGRAM.

  3Ø PRINT "ENTER ADDRESS TO LOA
D TO"
  4Ø INPUT A
  5Ø POKE A,16*CODE A$+CODE A$(2
)-476
  6Ø LET A=A+1
  7Ø LET A$=A$(3 TO )
  8Ø IF A$="" THEN STOP
  9Ø GOTO 5Ø



SCROLL DOWN. ADDRESS=16575

  1Ø LET A$="Ø1D6Ø22AØC4ØE5Ø9545
DØ1B5Ø2E1E5Ø9EDB8E1Ø62ØAF237710F
CC9"


SCROLL UP. ADDRESS=1661Ø

  1Ø LET A$="2AØC4Ø23E5Ø121ØØØ9D
1Ø1B5Ø2EDBØAFØ62Ø121310FCC9"


SCROLL LEFT. ADDRESS=1664Ø

  1Ø LET A$="AF2AØC4Ø23E5D1ØE16C
523Ø11FØØEDBØ12231313C1ØD2ØF1C9"


SCROLL RIGHT ADDRESS=16675

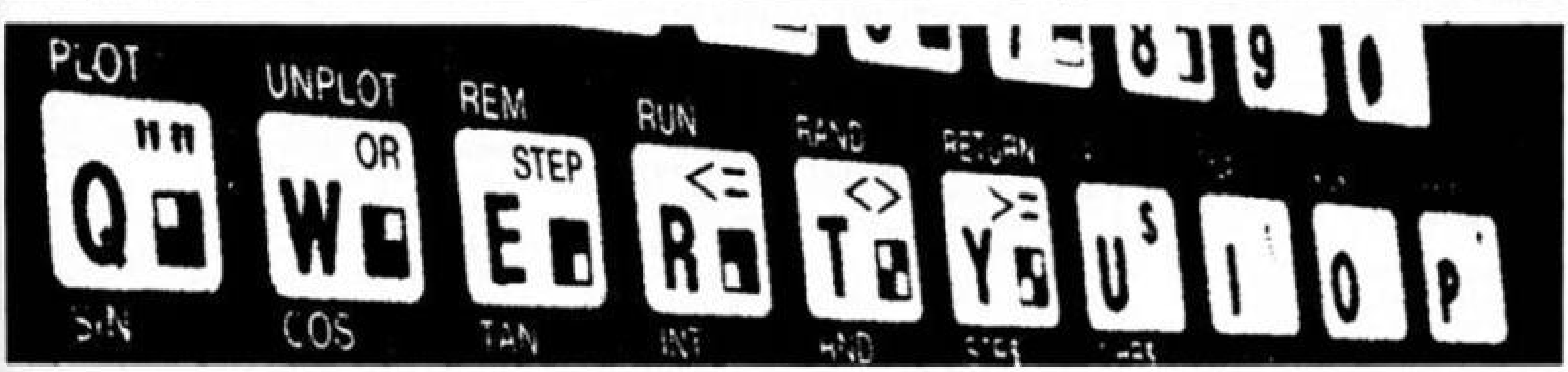
  1Ø LET A$="ØE16C5AF2AØC4ØØ12ØØ
ØØ9E5D12BØ11FØØEDB812C1ØDC8C5Ø14
1ØØ18ED"


NB. ALL SCROLLS WIPE THE LINE AT
THE END OF THE SCROLL, TO USE A
DIFFERENT CHARACTER FROM A SPACE
(Ø) CHANGE THE CODE 'AF' TO 3ENN
WHERE NN=THE CHARACTER CODE YOU
REQUIRE IE. 8Ø FOR AN INV.SPACE.
```

Software Mart

The ZX81 market is getting sparser all the time, but Arctan Computer Ventures who produced a graphics and utility program called MATRE 81 have now issued an improved and upgraded version called MATRE 2.

The original program was well received by our reviewer and this version is much better due to being written in machine code. Features such as backward animation have extended the scope of the program. So, software starved 81er's can send their PO's for £4.95 to 1 Foxwell Sq. Southfields, Northampton NN3 5AT.



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UNDERWORLD

by David Naylor

Underworld is an adventure for the 48K Spectrum, in which you have been stranded on the island of Brannal. The only way for you to escape is to collect the five Keys of Time and take them to the Keeper of Time who will enable you to escape. The only problem is that the Keys are in the possession of the Dark Lord and his followers who rule the island, and naturally they're none too keen on letting you get away...

The trouble with typing in adventure game listings is that by reading the listing you often get a good idea of how to complete the game, which obviously takes away half the fun. But with Underworld, David Naylor has provided a machine code 'scramble' routine which jumbled up all the text in the game before the listing was printed. The 'unscramble' routine is contained in the Basic loader (listing 1), so you can type in the scrambled listing without seeing the solutions to all the problems and then the loader program will unscramble it for you when you actually start to play the game.

Listing 1

This is the Basic loader containing the 'unscrambling' routine. Type this in (ignoring line 0) and SAVE it before RUNning it. To check the program add this line: **85 STOP.** Then RUN it. The checksum will tell you if any errors have been made, and if it's all OK you will see '9 STOP statement 85:1' come up on screen. When that happens delete line 85 and SAVE the program again with **SAVE "UNDERWORLD" LINE 1** — this is the final loader for use with the finished game.

Listing 2

This is the main game program which has been scrambled to stop you from seeing all the solutions. Be very careful to enter the scrambled text correctly as it can only be 'descrambled' properly if it's been entered correctly.

Printer problems

David has used certain codes in the game which don't show up on a printer. The first of these is the copyright symbol (©) which has been replaced in the listing by a plus sign (+). So, where a REM statement tells you to 'see text' this means that any plus signs in the following line should be replaced by the copyright symbol.

There are also a number of 'inverse' commands in the listing in the following lines, where text has to be typed-in in inverse mode. These are:

1082 all the text between quotation marks.
9522 the text between '+' signs.
9580 XIBU
9962/3 UIBU
9970 XIBU

To enter inverse mode, press Caps Shift and 4, enter the relevant piece of text and then press Caps Shift and 3 to return to normal mode.

PROGRAM 1

```
   0>REM UNDERWORLD LOADER
     David Naylor  1985
  20 CLEAR 64299
  30 BORDER 0: PAPER 0: INK 6: C
LS
  40 LET t=0
  50 FOR a=65200 TO 65293: READ
b: POKE a,b: LET t=t+b: NEXT a
  60 IF t<>12837 THEN  PRINT AT
10,0;"  ERROR IN DATA SET 1. REC
TIFY  "'TAB 10;"AND RERUN.",: BE
EP 1.5,30: STOP
  70 FOR a=65300 TO 65327: READ
b: POKE a,b: LET t=t+b: NEXT a
  80 IF t<>15169 THEN  PRINT AT
10,0;"  ERROR IN DATA SET 2. REC
TIFY  "'TAB 10;"AND RERUN.",: BE
EP 1.5,30: STOP
  90 RANDOMIZE USR 65300
 100 PRINT AT 1,0; BRIGHT 1;"LOA
DING THE UNDERWORLD."'"   PLEASE
 WAIT..."
 110 INK 0: LOAD "UNDERWORLD"
 120 REM DATA SET 1
 130 DATA 237,107,83,92,126,254,
34,202,199,254,35,237,91,75,92,1
67,237,82,208,25,195
 140 DATA 180,254,43,43,43,126,2
54,14,202,0,255,62,13,1,3,0,237,
177,202,0
 150 DATA 255,237,75,83,92,3,3,1
20,188,40,2,24,5,121,189,202,0,2
55,35,126
 160 DATA 254,34,202,186,254,254
,165,210,235,254,254,35,218,235,
254,53,195,235,254
 170 DATA 35,35,35,195,186,254,3
3,61,92,54,255,195,176,254
 180 REM DATA SET 2
 190 DATA 33,0,61,17,44,251,1,0,
3,126,203,47,182,18,19,35,11,121
,176,32,244,33,44,250,34,54,92,2
01
```

PROGRAM 2

```
   2 RANDOMIZE USR 65286
   3 LET a=6: LET b=7430: LET c=
1: LET d=0: LET e=128: LET f=749
5: LET g=7500: LET h=8000: LET i
=7960: LET j=9e3: LET k=7490: LE
T l=129: LET m=8650: LET n=9095:
 LET o=4: LET p=9980: LET q=7498
   5 LET r=100: LET s=105: LET t
=9965: LET u=2
  10 PAPER a: INK d: BORDER o: C
LS : LET h$="":  DIM r(35): DIM
a(27): DIM o(27): DIM u(a-c): DI
M m$(u,o-c): DIM v$(40,o-c): DIM
 v(40)
  15 FOR z=c TO 27: READ y: LET
a(z)=y: NEXT z
  20 DATA 5875,5700,d,900,5600,d
,5300,d,1690,590,4150,4750,4650,
d,d,d,d,d,d,d,3140,3260,d,d,5650
,d,4750
  25 LET r(34)=INT (RND*1e6): LE
T r(13)=1170: LET r(10)=INT (RND
*a)+c: LET loc=5725: LET st=30:
LET str=d: LET nt=d: LET sc=d: L
ET ca=d: LET no=d: LET so=d: LET
 ea=d: LET we=d: LET up=d: LET d
o=d
  30 IF INT (RND*a)>u THEN  LET
a(18)=5700
  35 POKE 23658,d: POKE 23609,20
: POKE 23617,236
  40 FOR z=c TO 40: READ v$(z),v
(z): NEXT z
  49 DATA "hfu",7600,"ubl",7600,
"esp",7700,"buu",9400,"iju",9400
,"ljm",9400,"j  ",7800,"jow",780
0,"csf",9470,"fyb",9510,"dmj",98
00
  52 DATA "qvm",9695,"dsp",9890,
"ifm",9600,"esj",9350,"uvs",9650
,"ejh",9670,"txj",9700,"xfb",910
0,"fou",9750,"uis",9830,"tbx",98
50,"mjh",9900
  55 DATA "sft",9635,"ufb",9590,
"mfb",9865,"sje",9740,"tus",9810
,"ujf",9920,"vou",9950,"vom",955
0,"pqf",9550,"sfb",9135,"gpm",91
83,"xbj",9635,"tmf",9635,"sbj",7
390,"fbu",9300,"csj",9150,"cmp",
9500
  58 REM INTRODUCTION
  60 PRINT TAB 8; FLASH c;"UIF
VOEFSXPSME";AT 21,5; FLASH d;"Cz
 Ebwje Obzmps    2:96"

  63 LET l$="BGUFS CFJOH USBOTQP
SUFE UISPVHI UJNF ZPV IBWF BSSJW
FE JO UIF    VOEFSXPSME/ EFTUSPZ
  UIF EBSL    MPSE- GJOE UIF 6 LF
ZT PG UJNF    BOE UBLF UIFN UP UI
F LFFQFS PO   UJNF JTMF////
                          HPPE MVD
L!"
  65 PRINT AT u,d: FOR z=c TO LE
N l$: PRINT l$(z);: BEEP .06,-40
: NEXT z
  70 PRINT '''; INVERSE c; FLASH
 c;"QSFTT BOZ LFZ UP CFHJO UIF R
VFTU"
  72 PAUSE c: PAUSE d: PRINT AT
12,d; INK o+c,,
  74 FOR z=d TO c: FOR w=d TO 4
  76 READ x,y: BEEP x,y: NEXT w
  78 RESTORE 80: NEXT z
  80 DATA .5,o+c,.5,a+c,c,o-c,c,
-9,1.75,-c-c
  90 LET l$="": PAPER a+c: BORDE
R a-c: INK d: CLS : GO TO loc
  99 REM COMMON LOCS.&DIRECTIONS
 100 INK a+c: BORDER o+c: PAPER
o-c: CLS : PRINT "Uif Jdf Njof/"
: GO TO l
 105 BORDER d: PAPER d: CLS
 106 IF NOT o(26) THEN  INK d: P
RINT  INK a+c;"Cfuufs hfu tpnf m
jhiu ifsf-gbtu/": GO TO l
 110 INK a+c: PRINT "Uif Cmbdl H
sfzhps qbttbhft/": GO TO l
 128 BORDER o+c: PAPER a+c: INK
d
 129 PRINT "Wjtjcmf fyjut bsf;"
 130 IF no THEN  PRINT ,"Opsui"
 132 IF so THEN  PRINT ,"Tpvui"
 134 IF ea THEN  PRINT ,"Fbtu"
 136 IF we THEN  PRINT ,"Xftu"
 138 IF do THEN  PRINT ,"Epxo"
 140 IF up THEN  PRINT ,"Vq"
 142 GO TO g
 199 REM WIN
 200 PAPER a+c: INK c+c: CLS
 205 FOR z=c TO 40: BORDER INT (
RND*7+1): PAPER INT (RND*7)+1: C
LS : BEEP .04,z
 210 NEXT z
 215 PAPER 7: INK 1: CLS
 220 CLS : PRINT  INVERSE c; FLA
SH c;''"Zpv sfuvso up uif mjwjoh
 xpsme/ ": PRINT  FLASH c;'''"
 Zpv bsf qsbjtfe bt b ifsp     "
 224 FOR z=c TO a+c
 225 BEEP .10,o+c: BEEP .10,a+c:
 BEEP .35,o-c: BEEP .35,-9: BEEP
 .68,-c-c
 226 NEXT z
 230 PRINT AT 10,c+c; BRIGHT c;"
Xjmm uif ifsp usz bhbjo0000"
 231 GO TO 9991
 299 REM LOCATION DESCRIPTION
 300 PRINT "B gpsl jo uif qbui p
o Esbl Ifbui/ B evtuz usbdl xjoe
t FBTU up b kbhhfe dmjgg/"
 302 LET no=5200: LET ea=5600: G
O TO e
```

```
 350 PRINT "B tnbmm dspttspbet/"
'"B obsspx ijmmtjef qbui svot"'"
FBTU boe up uif TPVUI uif mboe
jt esz boe cbssfo/ Esbhhfe gppu
tufqt usbjm bdsptt uif evtuz
mboe/"
 352 LET so=4650: LET ea=400: LE
T we=5175: GO TO e
 400 PRINT "J bn bu uif foe pg b
 mpoh sjehf cz uif tfb/ Uif hspv
oe jt nveez boe jo uif hsbtt uif
sf bsf effq dbsu usbdlt/"
 402 LET no=4550: LET we=350: GO
 TO e
 420 PRINT "B sjehf bcpwf EFBUI
WBMMFZ/"'"Cmbdl txjsmjoh dmpvet
bsf cfmpx nf/"
 422 LET do=4150: LET no=4350: G
O TO e
 460 PRINT "J bn jo b mbshf hsbw
fm qju/"'"Bspvoe nf uifsf bsf sp
uujoh"'"tlfmfupot///VVSSshhii!!!
"'"Hfu nf pvu!!"
 462 LET ea=4725: LET we=4850
 464 IF r(15) THEN  PRINT "Uif i
fbwz sbjo ibt ejtuvscfe uifhsbwf
m/": IF NOT a(a*o) THEN  LET a(a
*o)=loc
 466 GO TO e
 500 PRINT "J bn bu uif cpuupn p
g b dibtn/  Tdsbqt pg nfbu bsf p
o uif hspvoebspvoe nf- qspcbcmz
uif mbtu    fyqmpsfs!!"'"Uif xbm
mt bsf tnppui cvu usff   spput k
vu pvu boe tqbo qbsut pg uifn/"
 502 LET no=560: LET so=620: LET
 we=590: GO TO l
 560 LET ea=900: LET so=500: GO
TO s
 590 LET ea=500: LET no=1410: GO
 TO s
 620 LET no=500: LET ea=650: GO
TO s
 650 PRINT "EBOHFS!!": LET no=68
0: LET ea=720: LET we=620: LET s
o=1140: GO TO s
 680 LET ea=710: LET so=650: GO
TO s
 710 LET no=1490: LET we=680: GO
 TO s
 720 LET no=1450: LET ea=1540: L
ET we=650: GO TO s
 750 LET so=1200: GO TO s
 780 LET ea=810: LET we=870: GO
TO s
 810 PRINT "EBOHFS!!": LET no=13
50: LET ea=1140: LET we=780: GO
TO s
 870 LET ea=780: LET so=1490: LE
T we=900: GO TO s
 900 LET ea=870: LET no=990: LET
 we=560: GO TO s
 990 LET so=1410: LET ea=1050: G
O TO s
1020 LET no=1080: LET ea=1050: G
O TO s
1050 PRINT "EBOHFS!!": LET ea=12
00: LET we=1020: LET so=1140: GO
 TO s
1080 PRINT "Uif uvoofm dvswft hf
oumz XFTU   boe uifsf jt b tjho/
//"
1082 PRINT  INK o-c;"
                               E
BOHFS                         LF
FQ PVU!
                    "
1084 PRINT '"B tnbmm sfe epps cf
mpx uibu jt  ipmejoh cbdl b ejth
vtujoh"'"tufodi/": LET so=1020:
GO TO l
1110 BORDER d: PAPER d: INK a+c:
 CLS : PRINT "J bn bu b gpsl jo
uif npvoubjo  uvoofmt/Uifsf jt b
o pwfsqpxfsjohtufodi dpnjoh opsu
ixbset/"''"EBOHFS!!"
1114 LET ea=1080: LET so=1140: L
ET no=1170: GO TO l
1140 PRINT "J xbml epxo uif uvoo
fm boe b"'"ibjsz Hpcmjo kvnqt po
 nf/"'"Votifbuijoh ijt bmsfbez c
mppefelojgf if dbudift nf pgg h
vbse///": PAUSE d: GO TO p
1170 INK c: BORDER a+c: PAPER a+
c: CLS
1171 PRINT "J bn bu bo fousbodf
up b tfb    dbwf po uif Xftu dpb
tu/ Po uif  tipsf bo pme tfb eph
 sftut xijmftnpljoh ijt qjqf/"
1172 IF r(13)=loc THEN  PRINT "I
f jt tjuujoh cz b tnbmm xppefo c
pbu/"
1174 LET ea=1110: GO TO e
1200 LET ea=1260: LET we=1050: L
ET no=750: GO TO s
1230 LET ea=1260: LET so=1245: G
O TO s
1245 PRINT "Uif dibtn cpuupn/"'"
Bcpwf nf uifsf jt uif hsfz tlz/
Uif sfnobout pg b gjsf bsf"'"tnp
vmefsjoh jo b dpsofs/ Uif"'"gmpp
s cfbst sjuvbm nbsljoht/"
1247 IF r(u) THEN  LET up=5150
1249 LET no=1230: LET ea=1290: G
O TO l
1260 LET no=1200: LET we=1230: L
ET ea=1320: GO TO s
1290 LET we=1245: GO TO s
1320 LET so=1350: LET we=1260: G
O TO s
1350 LET no=1320: LET so=1540: L
ET we=810: GO TO s
1410 PRINT "J bn jo b mbshf- qbs
ujbmmz mju  dbwfso/"
1411 IF r(26) THEN  PRINT "Po ui
f hspvoe mjft b efbe ovmlb/": GO
 TO loc+a+c
1412 PRINT "Bo pme ovmlb.pof pg
uif xjtf"'"qfpqmf jt xsjujoh po
b tupof    ubcmfu/"
1414 PAUSE u*r: PRINT "If tmpxmz
 xbmlt upxbset nf boe  qbvtft up
 tqfbl/": PAUSE r
1415 REM See text
1416 PRINT "*Cfxbsf uif///*"',."
If jt tusvdl cz bo bsspx gspn
cfijoe/ If jt efbe/ J tff"'"opcp
ez/"
1418 LET r(26)=c: LET no=990: LE
T so=590: GO TO l
1450 PRINT "J bn jo b dpme dbwf
xjui"'"dsvncmjoh xbmmt/ B tlfmfu
po jt  tmvnqfe jo b dpsofs- nptu
 pg uifcpoft ibwf cffo difxfe bx
bz/"
1452 LET we=720: GO TO l
1490 PRINT "J bn jo b tnbmm csjh
imz mjhiu   dbwf/"'"J ifbs gbejo
h gpputufqt/"'"Jo uif dpsofs uif
sf jt bo pqfo  hmbtt dbtf/"
1494 LET no=870: LET so=710: GO
TO l
1540 PRINT "Uif uvoofm tusfudift
 OPSUI boe  TPVUI boe J dbo ifbs
 svoojoh"'"xbufs": IF r(5) THEN
 PRINT "Uispvhi b ipmf J dbo tff
 b ebsl voefshspvoe sjwfs/"
1544 LET no=1350: LET so=720: GO
 TO l
1600 PAPER a+c: INK c: BORDER a+
c: CLS
1601 PRINT "J bn bu b dbwf fousb
odf jo uif  tjef pg bo jdf dpwfs
fe npvoubjo/Uif ebsl dbwf ejtbqq
fbst FBTU/"
1604 LET ea=1630: GO TO e
1630 LET ea=1660: LET so=1720: L
ET we=1600: GO TO r
1660 LET we=1690: LET no=1630: L
ET so=2200: GO TO r
1690 LET no=1660: LET ea=2200: L
ET we=2230: GO TO r
1720 LET we=1780: LET so=2230: L
ET no=1630: GO TO r
1780 LET ea=1720: LET so=1870: G
O TO r
1810 PRINT "Uif Jdf Njof/"'"EBOH
FS!!"
1812 LET ea=1140: LET so=1900: L
ET we=ea: GO TO l
1840 PAPER a+c: INK c: BORDER a+
c: CLS
1841 PRINT "J bn bqqspbdijoh bo
jdf dpwfsfe npvoubjo/ Uifsf jt b
mpx dbwf upuif FBTU/"
1842 LET ea=1870: LET we=5925: G
O TO e
1870 LET no=1780: LET ea=1900: L
ET we=1840: GO TO r
1900 LET ea=1930: LET we=1870: L
ET no=1810: GO TO r
1930 PRINT "Uif Jdf Njof/"'"Jogs
pou pg nf uifsf jt b cspo(f epps
 xjui hpmefo ijohft/"
1932 LET we=1900: GO TO l
2200 LET no=1660: LET we=1690: G
O TO r
2230 PRINT "Uif Jdf Njof/"'"Jogs
pou pg nf uifsf jt b svtuz  epps
 xjui b cspo(f mpdl/"
2232 LET ea=1690: LET we=1720: G
O TO l
2260 PRINT "J bn jo bo jdf upnc/
 Uifsf jt bopqfo jdf dpggjo jogs
pou pg nf/  Jdjdmft bsf ibohjoh
gspn uif"'"nptt dpwfsfe sppg/"
2264 LET no=2230: GO TO l
2500 PRINT "Uif jdf usfbtvsf ibm
m/ J dbo tffqjmft pg ejbnpoet '
csjmmjbou   dsztubm kfxfmt foupn
cfe jo jdf/"
2502 LET we=1930: GO TO l
2990 IF r(21) THEN  LET r(21)=d
2991 PRINT "Uif Dsztubm Dbtumf n
pbu/ Uif"'"qpsudvmmjt jt mpdlfe
boe cpmufe-uif esbxcsjehf jt epx
o/"
2992 LET z=INT (RND*3)
2993 IF NOT z THEN  PRINT "B hpm
efo dbssjbhf qvmmfe cz"'"tjmwfs
ippwfe ipstft jt"'"bqqspbdijoh/"
: LET r(21)=c
2996 LET no=5175: GO TO e
3020 PRINT "B mpoh uijo ibmmxbz
jo uif"'"Dsztubm dbtumf/ Uif Hsf
bu Ibmm  jt jogspou pg nf/"
3022 LET no=2990: LET so=3050: L
ET ea=3080: GO TO e
3050 PRINT "Uif Hsfbu Ibmm pg ui
f Dsztubm   Ljoh.uif Ebsl Mpse p
g uif"'"VOEFSXPSME/ Nptu pg uif
ibmm jt cbsf cvu sfe nptt dpwfst
 uif"'"gmpps boe hmjtufojoh dszt
ubm uifsppg/"
3052 LET no=3020: LET so=3380: G
O TO e
3080 PRINT "Uif dbtumf hvbse spp
n boe"'"bsnpvsz/ Nptu pg uif xfb
qpo"'"sbdlt bsf fnquz/ Opcpez jt
 ifsf/"
3082 LET we=3020: GO TO e
3140 PRINT "Uif dbtumf gppe ' xj
of tupsf/   Uifsf bsf tbdlt pg h
sbjo-cbssfmtboe dsbuft bhbjotu u
if xbmm/"
3142 LET we=3410: LET no=3200: G
O TO e
3170 PRINT "B dpoofdujoh qbttbhf
/ Uifsf bsf xppefo cfbnt po uif
sppg boe    tpmje qbofmt po uif
xbmmt/"
3172 IF a(19) THEN  PRINT "Uifsf
 jt b ipmf jo uif gmpps-   tpgu
fbsui jt cfmpx/"
3174 LET no=3080: GO TO e
3200 PRINT "Uif njssps sppn/ Tij
ojoh njsspstdpwfs uif xipmf sppn
/ J dbo tff ivoesfet pg qfpqmf!"
3202 LET so=3140: LET no=3170: G
O TO e
3260 PRINT "Uif Ljoh(t npofz wbv
mu/"'"Uipvtboet pg hpme qjfdft b
sf"'"qjmfe po tjmwfs ubcmft/"
3262 LET we=3350: GO TO e
3290 LET no=d: LET so=d: LET ea=
d
3295 PRINT "J bn jo b mpdlfe dfm
m! Uif lfzt bsf po b ippl po uif
 xbmm- kvtu pvu pg sfbdi/Uif cbs
t bsf uijdl/B gppe usbz sftut po
 b xjoepx   mfehf pvu pg sfbdi b
oe b cspxo  gvohj jt hspxjoh pwf
s uif xjoepx/": GO TO g
3350 PRINT "Uif dbtumf dfmmbs/ U
ifsf jt b  usbqepps jo pof dpso
fs boe sbut tdvssz bspvoe uif tu
psft pg"'"gppe/"
3351 IF r(3) THEN  PRINT "Uif ep
ps ibt cffo tnbtife/": LET do=33
70
3352 LET ea=3260: LET no=3290: L
ET so=3410: GO TO e
```

SPECTRUM PROGRAMMING

```
3370 PRINT "Uif ebsl xjoejoh uvo
ofm/ Bcpwf  nf uifsf jt b gvohj
dpwfsfe usbqepps"
3371 IF r(3) THEN  LET up=3350:
PRINT "Ju ibt cffo tnbtife/"
3372 LET so=5650: IF o(26) THEN
 LET so=5700
3374 GO TO e
3380 PRINT "Uif hmppnz dpvsuzbse
 pg uif"'"Dsztubm Dbtumf/ B cmbd
l nbsf boedbssjbhf tuboe pqqptju
f/"
3382 LET no=3050: LET so=3410: G
O TO e
3385 PRINT "J bn tjuujoh jo uif
dbssjbhf jo uif hmppnz dpvsuzbse
/ Uif tpgu  tfbut bsf dpwfsfe jo
 sfe wfmwfu/": GO TO g
3410 PRINT "Uif ljudifot/ Uif dp
pl jt"'"qsfqbsjoh Cphmf Tufx boe
 epfto(utff nf/"
3412 LET ea=3140: LET no=3380: L
ET we=3350: GO TO e
3440 PRINT "Uif txfmmjoh Sjwfs U
pmmf/ Bcpwf uif xbufs uifsf jt b
 dipljoh"'"njtu boe vqtusfbn J d
bo ifbs"'"tdsfbnt/"
3444 LET no=5350: LET ea=4300: G
O TO e
3450 PRINT "J bn po uif hpmefo t
boet pg"'"UJNF JTMF/ Ofbscz uifs
f jt b"'"eppsxbz boe uif LFFQFS
PG UJNF  tuboet epnjoboumz cz/"'
"Njtuz ijmmt tvsspvoe nf/"
3452 PRINT "Uifsf jt b spuujoh o
pujdfcpbse  mzjoh po uif tboet/"
3455 LET so=3460
3458 LET no=3780: LET ea=no: LET
 we=no: GO TO e
3460 PRINT "J tuboe cz uif LFFQF
S pg UJNF/ Bhsfbu epps jt cfijoe
 ijn/"
3462 GO TO 3458
3780 PRINT "J xbml bmpoh b usff
dpwfsfe qbui/ Uif usfft cfdpnf w
fsz efotf   boe J dboopu tff qsp
qfsmz/"'"J xbml"'TAB a;"joup"'TA
B 10;"tpnf"'TAB 14;"rvjdltboe///
": PAUSE d: GO TO p
3900 PRINT "Opsui Qpjou/ Uif tfb
 jt dsbtijohpo uif spdlt bspvoe
nf/"
3902 IF r(13)=loc THEN  PRINT "U
ifsf jt b tnbmm xppefo cpbu po u
if tipsf/"
3906 LET so=3950: GO TO e
3950 PRINT "J bn po spdlt cz uif
 dpbtu/ Hbt gjmmfe nbstift bsf u
p uif TPVUI/"
3952 LET no=3900: LET so=4900: G
O TO e
4000 PRINT "J bn TPVUI pg uif pn
jopvt"'"EFBUI WBMMFZ/"
4002 LET no=4150: LET ea=4800: G
O TO e
4100 PRINT "J bn OPSUI pg EFBUI
WBMMFZ/Cmbdldmpvet bsf txjsmjoh
bspvoe mpx  jo uif wbmmfz boe J
dbo ifbs"'"tusbohf opjtft gspn x
juijo/"
4102 LET so=4150: GO TO e
4150 PRINT "EFBUI WBMMFZ/ 6 dmpb
lfe gjhvsft bsf xbmljoh bspvoe b
 hmpxjoh"'"gjsf xijmf diboujoh/
B txjgu jt gmzjoh bcpwf uif gmbn
ft/"
4160 LET no=4100: LET up=4200: L
ET so=4e3: GO TO e
4200 PRINT "J bn bcpwf EFBUI WBM
MFZ po b"'"sjehf/ Cmbdl txjsmjoh
 dmpvet bsfcfmpx/"
4202 LET no=4350: LET do=4150: G
O TO e
4300 PRINT "J bn po b mpoh spqf
csjehf pwfs uif cpuupnmftt wbmmf
z/ Uifsf jt b npvoubjo up uif TP
VUI/"
4302 LET we=3440: LET no=5775: G
O TO e
4350 PRINT "Uif Cmbdl Dmjggt cz
uif svjot pguif upxo pg Dsbjo/"
4352 IF o(9) OR o(21) THEN  PRIN
T "Bo tubswjoh nbo xboujoh gppe"
'"buubdlt nf/ If jt uif tuspohfs
  boe gpsdft nf pwfs uif dmjgg//
//": PAUSE d: GO TO p
4354 LET ea=4400: LET so=4200: G
O TO e
4400 PRINT "B qfccmfz tipsf po u
if opsuifso dpbtu/";: IF o(18) T
HEN  PRINT "J ibwf gpvoe b dbwf
hpjoh TPVUI/": LET so=4500
4402 LET we=4350: GO TO e
4500 PRINT "B tnbmm hpmefo cfbdi
/ B qbui"'"hpft vq tboe evoft up
 uif FBTU/ Po bo jtmboe pgg tips
f uifsf jt dbtumf svjo/";: IF o(
11) THEN  PRINT "J tff b dbwf jo
 uif opsui dmjgg/": LET no=4400
4502 LET so=4550: LET we=4750: L
ET up=we: GO TO e
4550 PRINT  INK o-c;"     Uif XF
MM PG GPSUVOF"; INK c;'"Uif cvdl
fu jt bu uif cpuupn boe uifsf jt
 op xjoejoh iboemf/"
4552 LET no=4500: LET so=400: GO
 TO e
4650 PRINT "J bn po b dmjggupq q
bui/ Uifsf  jt b qppm pg cmppe p
o uif hsbtt/"
4652 LET no=350: LET so=5775: LE
T we=5725: GO TO e
4700 PRINT "Nz xbz jt cmpdlfe cz
 b ijhi xbmmnbef pg tpmje hpme/"
4702 LET no=4750: GO TO e
4725 PRINT "J bn jo gspou pg b i
jhi- hpmefo xbmm cvjmu bdsptt ui
f spbe/ Effq- xjef ejudift bsf p
o cpui tjefttp uifsf jt op xbz s
pvoe/"
4727 LET so=460: GO TO e
4750 PRINT "Uif EFBE MBOET pg UI
SPO/ B djuz xjui hpmefo xbmmt bo
e hmjtufojohgpvoubjot jt gbs up
uif OPSUI   pwfs tboe evoft/ B e
fbe hsfzxpmgmjft ofbs nz gffu< b
 wvmuvsf jt tdbwbhjoh po jut cpe
z/"
4752 LET no=4775: LET we=no: LET
 so=4700: LET ea=so-r-r: GO TO e
4775 PRINT "J dbo ibsemz tff nz
qbui bt uif tvo cfdpnft pwfsqpxf
sjoh boe op xbufs jt jo tjhiu/ J
 hp po cvu  ju bmm cfdpnft upp n
vdi///": PAUSE d: GO TO p
4800 PRINT "J jo b tfnj.eftfsu x
jui b ivu upuif TPVUI/ Uif EFBE
MBOET bsf   OPSUI/"
4802 LET we=4e3: LET so=4850: LE
T no=4775: LET ea=no: GO TO e
4850 PRINT "J bn jo b mbshf nve
ivu/ 5 cjse dbhft bsf ibohjoh gs
pn uif"'"dfjmjoh boe b mbshf pme
 xpnbo   jt gffejoh uif cjset xj
ui tffe/"
4854 LET no=4800: LET ea=460: LE
T we=4950: GO TO e
4900 IF o(26) THEN  GO TO 9825
4901 PRINT "Uif Xijuf Nbstift/"
4902 IF r(15) THEN  PRINT "Ju ib
t cffo sbjojoh boe uif      nbsti
ft bsf wfsz tpgu/ "; FLASH 1;"IF
MQ///!": PAUSE d: GO TO p
4903 PRINT "Uif hspvoe jt gbjsmz
 tpmje/Ju jttbgf up xbml po/"
4904 LET no=3950: LET so=4950: G
O TO e
4950 PRINT "J bn jo b ejq jo uif
 spbe xifsf b tusfbn tffnt podf
up gmpxfe   bdsptt/ Uifsf bsf nb
stift up uifOPSUI boe///opu nvdi
 fmtf!"
4952 LET ea=4850: LET no=4900: G
O TO e
5100 PRINT "J bn cz xffe dpwfsfe
 tufqt uibu xjoe uifsf xbz vq ui
f tjef pg b npvoubjo/ Uifsf jt b
o pbl gpsftuup uif FBTU/ B hsfz
sjwfs gmpxt gspn voefs uif npvou
bjo/"
5102 LET so=5200: LET ea=5400: L
ET up=5150: GO TO e
5150 PAPER a+c: INK c: BORDER a+
c: CLS
5151 PRINT "Uif upq pg uif cmbdl
 npvoubjo/  Uifsf jt b mbshf dsb
dl jo uif   hspvoe cz nz gffu/B
dbwf ofuxpslsvot cfmpx/"
5152 IF r(u) THEN  LET do=1245
5154 LET ea=5100: GO TO e
5175 PRINT "J bn po uif fehf pg
b hmjtufojohqppm/ Uif cpuupn jt
dpwfsfe jo  tjmwfs/"
5177 LET so=2990: LET ea=350: GO
 TO e
5200 PRINT "J bn tbu po b nfubm
cfodi cz b  qfccmfz qbui/ Up uif
 OPSUI uifsfjt b svhhfe npvoubjo
/"
5202 LET no=5100: LET so=300: GO
 TO e
5250 PRINT "J bn cz b tuffq qbui
 xjoejoh"'"EPXO b dmjgg/ Cfmpx u
ifsf jt b  tnbmm tfdmvefe dpwf/H
pstf cvtiftbsf hspxjoh up uif OP
SUI/"
5256 LET do=5650: LET ea=5925: G
O TO e
5275 PRINT "B xjoez npps/ Uif hs
pvoe jt"'"nveez boe bu nz gffu u
ifsf jt b mbshf sbccju ipmf/"
5277 LET so=5925: LET do=5300: G
O TO e
5300 PRINT "J bn jotjef b mbshf
sbccju"'"cvsspx/ Uifsf jt wfsz m
juumf"'"sppn up npwf boe bmm pui
fs"'"uvoofmt bqbsu gspn uif pof
J    dbnf epxo bsf upp tnbmm up
vtf/ Uifsf jt uif qpvoejoh pg gf
fu   epxo tpnf uvoofmt/"
5305 LET up=5275: GO TO e
5350 PRINT  PAPER 4;"J bn jo b d
mfbsjoh jo uif pbl   gpsftu/ Uif
sf bsf tdsbqt pg nfbupo uif hspv
oe boe uif sfnbjot pgb gjsf/"
5352 LET we=5400
5354 LET ea=5400: LET no=ea: LET
 so=ea: GO TO e
5400 PRINT  PAPER 4;"J bn xboefs
joh jo bo pbl gpsftu/"
5402 GO TO 5352
5415 PRINT  PAPER 4;"J bn jo b u
joz dmfbsjoh xjuipvu nvdi mjhiu/
 Uifsf jt b ipmmpx jouif tpgu hs
pvoe boe uif bsspxt  qpjou XFTU/
"
5417 LET we=5100: GO TO 5354
5600 PRINT "J bn po bo pvudspq p
g spdlt/ B  tijqxsfdl jt kvtu pg
g tipsf/"
5602 LET we=300: GO TO e
5650 PRINT "B ujoz dpwf/ B dbwf
svot OPSUI/ ";
5652 LET z=RND*2: IF z>.15  THEN
  PRINT "Uif dmjgg qbui jt opx d
vu pgg czuif ujef/": GO TO 5656
5654 LET up=5250
5656 LET no=3370: IF o(26) THEN
 LET no=5700
5658 GO TO e
5700 PRINT "B ebsl xjoejoh uvoof
m/"
5702 LET no=3370: LET so=5650: G
O TO e
5725 PRINT "J bn jo uif cvtz upx
o pg Csboobm/ Uifsf bsf tpvoet p
g b nbslfu  dpnjoh gspn bo bsdix
bz boe b"'"ebodjoh cfbs jt qfsgp
snjoh jo   uif tnbmm trvbsf/"
5727 LET ea=4650: GO TO e
5775 PRINT "Uif npvui pg b mbshf
 ftuvbsz/   B qfojotvmb pg nbsti
ft jt up uifOPSUIFBTU boe b gpsf
tu up uif   XFTU/"
5777 LET no=4650: LET ea=5825: L
ET so=4300: GO TO e
5825 IF o(26) THEN  GO TO 9825
5826 PRINT "Uif Qfo Nbstift/"
5828 IF r(15) THEN  PRINT "Tpssz
//uif nbstift xfsf opu esz/J(n t
joljoh/ "; FLASH 1;"IFMQ///!!":
PAUSE d: GO TO p
5829 PRINT "J xbml rvjdlmz uispv
hi uif esz  nbstift/"
5830 LET no=5875: LET so=5775: G
O TO e
5875 PRINT "Uif qfojotvmb ifbe/
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Nbstift bsf up uif TPVUI- tfb up
 uif OPSUI/"
5877 LET so=5825: GO TO e
5900 IF NOT r(17) THEN  PRINT  I
NK 5;"J kvnq joup uif xbufs///"'
"Ju jt jdf dpme boe J gsff(f up
 efbui///": PAUSE d: GO TO p
5901 PRINT "J kvnq joup uif ebsl
 npvoubjo   sjwfs/": PAUSE 75: P
RINT "CSssss! Ju jt dpme cvu nz
dmpbl lffqt jo tpnf ifbu/":
5905 PAUSE r: PRINT "Uif gmpx db
ssjft nf pvu pg uif  npvoubjo tj
ef boe J bn txfqu"'"epxotusfbn/"
: PAUSE 200: PRINT "J hsbc b csb
odi pg b  usff/": PAUSE 200: LET
 loc=3440: GO TO loc
5925 PRINT "B nveez dmjgg qbui/
Ebohfspvt   spdlt bsf gbs cfmpx/
"
5927 LET ea=1840: LET we=5250: L
ET no=5275: GO TO e
7300 IF NOT o(25) THEN  PRINT "J
 qbeemf gspn uif tipsf boe"'"txj
smjoh tfb ublft nf TPVUI/": PAUS
E s: PRINT "J bn uispxo gspn uif
 cpbu boe   tjol voefs///": PAUS
E d: GO TO p
7305 PRINT "J dbtu pgg boe spx p
vu up tfb/"
7310 IF loc<>3450 AND u(3)=u AND
 o(16) AND o(17) AND o(18) AND o
(19) AND o(20) THEN  PRINT "Bguf
s b ebohfspvt dspttjoh J"'"mboe
po uif tipsf pg uif jtmboe/": PA
USE 500: LET loc=3450: LET r(13)
=loc: GO TO k
7318 PRINT "B tuspoh dvssfou boe
 xbsn csff(fcmpx nf spvoe uif dp
btu/"'"Fwfouvbmmz J spx up tipsf
/": PAUSE 500
7320 IF loc=1170 THEN  LET loc=3
900: GO TO 7322
7321 IF loc=3900 OR loc=3450 THE
N  LET loc=1170
7322 LET r(13)=loc: GO TO k
7390 IF loc<>2990 OR NOT r(21) T
HEN  GO TO n
7392 IF d$="sbjtf uif qpsudvmmjt
!" THEN  LET loc=3020: GO TO k
7394 GO TO n
7400 REM MOVEMENT CHECK
7410 IF NOT do THEN  GO TO q
7420 LET loc=do: GO TO k
7425 IF NOT up THEN  GO TO q
7426 LET loc=up: GO TO k
7430 IF NOT no THEN  GO TO q
7435 LET loc=no: GO TO k
7440 IF NOT so THEN  GO TO q
7445 LET loc=so: GO TO k
7450 IF NOT ea THEN  GO TO q
7455 LET loc=ea: GO TO k
7460 IF NOT we THEN  GO TO q
7462 LET loc=we
7495 LET nt=d: LET str=d: LET no
=d: LET so=d: LET ea=d: LET we=d
: LET up=d: LET do=d
7496 FOR z=c TO a-c: IF u(z)=c T
HEN  LET u(z)=d: NEXT z
7497 CLS : GO TO loc
7498 PRINT "J dboopu hp jo UIBU
ejsfdujpo/": GO TO j
7500 REM SEE ROUTINE
7505 RESTORE i
7510 FOR z=c TO 27: READ w$,x$
7513 IF loc<>a(z) OR o(z) THEN
GO TO 7530
7515 IF NOT nt THEN  LET nt=c: P
RINT '"J tff///"
7520 PRINT TAB a+c;"b ";w$;" ";x
$
7530 NEXT z
7540 LET nt=d: GO TO h
7600 REM TAKE ROUTINE
7601 IF r(u) AND m$(u)="spq" OR
m$(u)="cpb" THEN  GO TO n
7603 IF ca=7 THEN  PRINT "J dbo(
u dbssz boz npsf!": GO TO j
7606 RESTORE i
7607 FOR z=c TO 27
7610 READ w$,x$
7615 IF a(z)=loc AND NOT o(z) AN
D m$(u)=x$( TO o-c) THEN  LET ca
=ca+c: LET o(z)=c: GO TO t
7620 NEXT z
7630 GO TO t-u
7700 REM DROP ROUTINE
7702 RESTORE i
7710 FOR z=c TO 27
7720 READ w$,x$
7725 IF m$(u)=x$( TO o-c) AND o(
z) THEN  LET ca=ca-c: LET a(z)=l
oc: LET o(z)=d: GO TO t
7730 NEXT z
7732 GO TO t-o+c
7800 REM PRINT INVENTORY ROUTINE
7805 RESTORE i
7810 PRINT "J ibwf//"
7812 IF NOT ca THEN  PRINT TAB a
;"Opuijoh": GO TO j
7815 FOR z=c TO 27
7818 READ w$,x$
7820 IF o(z) THEN  PRINT TAB a;"
b ";w$;" ";x$
7822 NEXT z
7825 GO TO j
7960 DATA "cspo(f","lfz","tuspoh
","spqf","csbtt","sjoh","mpoh","
xjsf","qjsbuf(t","dvumbtt","xppm
mfo","dmpbl","spvhi","qbsdinfou"
,"svtuz","mbnq","ibn ' difftf","
tboexjdi","zfmmpx","ovhhfu"
7965 DATA "xjodi","iboemf","tnbm
m","tqbef","mpoh","txpse","tjmwf
s","tbx","hpcmjo(t","lfz","2tu",
"lfz","3oe","lfz","4se","lfz","5
ui","lfz","6ui","lfz","spbtu","d
ijdlfo","ljoh(t","npofz"
7970 DATA "cmvf","gmjou","nfubm"
,"ibu","qbjs pg","pbst","mju","m
bnq","cvdlfu pg","tpjm"
8000 REM OTHER CHARACTERS
8001 LET b$=" foufst/"
8002 IF loc>3900 AND loc<5875 AN
D loc<>4850 AND loc<>5700 THEN
GO TO 8470
8005 IF loc>2990 AND loc<3370 TH
EN  GO TO 8075
8015 IF loc>499 AND loc<1591 AND
 loc<>1170 THEN  GO TO 8275
8020 IF loc>1600 AND loc<2551 AN
D loc<>1840 THEN  GO TO 8374
8040 GO TO j
8075 IF loc=3290 THEN  GO TO j
8077 LET z=INT (RND*30)+8076: GO
 TO z
8090 LET a$="B hvbse dmbe jo hpm
efo bsnpvs  ": LET str=RND*5+8
8094 IF NOT u(c) THEN  LET a$="U
if Cmbdl Tpsdfsfs pg uif dbtumf"
: LET str=RND*5+12: LET u(c)=c
8096 GO TO m
8097 IF NOT u(u) THEN  LET a$="U
if esvolfo kbjmfs": LET u(u)=c:
LET str=RND*5+9
8099 GO TO m
8107 IF u(3)=u THEN  GO TO m
8108 IF r(19)=o-c THEN  GO TO j
8112 PRINT "Uif Ebsl Pwfsmpse pg
 uif DsztubmDbtumf boe Voefsxpsm
e foufst/"'"If sbjtft ijt hpmefo
 cbupo boe  qpjout ju upxbset nf
/": LET u(3)=c: GO TO m
8119 REM see text
8120 PRINT '"+OPX ZPV EJF!+ If t
ipvut boe b  tusfbl pg tjmwfs mj
hiuojoh gmjftgspn uif cbupo/ Ju
ijut///": PAUSE d: GO TO p
8275 IF NOT o(26) AND NOT INT (R
ND*o) THEN  PRINT  INK a+c;"J ib
wf usjqqfe boe dsbdlfe nz  ifbe
///": PAUSE d: GO TO p
8276 LET z=INT (RND*10)+8280: GO
 TO z
8280 LET a$="B dbwf toblf": LET
l$=" tmjuifst cz/": LET str=RND*
5+a: GO TO m
8282 LET a$="B cphmf tmbwf": LET
 str=RND*5+10: GO TO m
8284 LET a$="B cmbdl wbnqjsf": L
ET str=RND*5+11
8286 GO TO m
8287 LET a$="B nve nbo": LET str
=RND*5+8: GO TO m
8300 GO TO j
8376 LET z=INT (RND*10)+8380: GO
 TO z
8380 GO TO m
8383 IF NOT u(o) THEN  LET a$="B
 Njof Hvbse": LET u(o)=c: LET st
r=RND*10+12: GO TO m
8385 IF NOT u(o+c) THEN  LET a$=
"B Cmbdl Xbudifs": LET u(o+c)=c:
 LET str=RND*10+18: GO TO m
8386 GO TO j
8391 LET a$="Bo jdf eph": LET st
r=RND*5+7: GO TO m
8470 LET z=INT (RND*s)
8475 IF z<30 AND r(15) THEN  PRI
NT "Uif ebsl tvo esjft vq uif mb
oe/": LET r(15)=d
8476 IF z>53 AND NOT r(15) AND l
oc<>5700 THEN  PRINT "Ju cfhjot
up sbjot/": LET r(15)=c
8479 LET z=INT (RND*s)+8476: GO
TO z
8490 GO TO m
8500 LET a$="B tdbwbhjoh hsfz xp
mg": LET str=RND*5+8
8525 GO TO m
8530 LET a$="B spdl tdpsqjpo": L
ET str=o+c
8535 GO TO m
8540 LET a$="B dsztubm.fzfe xfsf
xpmg": LET str=RND*5+10
8550 GO TO m
8560 LET b$=" txppqt epxo/": LET
 a$="B tjmwfs ibxl": LET str=RND
*5+10
8650 IF NOT str THEN  GO TO j
8652 BEEP .25,st-10: PRINT a$;b$
8654 IF loc>2990 AND loc<3370 AN
D NOT INT (RND*4) AND loc<>3290
THEN  LET loc=3290: LET str=d: P
RINT "J ibwf cffo dbquvsfe!": PA
USE 200: GO TO k
8655 LET z=INT (RND*10)+8661: GO
 TO z
8661 PRINT "If buubdlt nf/": LET
 r(c)=c: BEEP .5,30-RND*20
8999 REM INPUT ROUTINE
9000 POKE 23692,a: BEEP .1,-25
9002 IF NOT r(33) AND (o(13) OR
o(o+c)) THEN  LET r(33)=c: LET s
t=st+10
9004 INPUT "?"; LINE d$: IF d$="
1" THEN  LET d$=e$
9006 IF d$="" THEN  GO TO j+o
9008 LET e$=d$
9010 PRINT  INK c;":";d$;"-"
9012 FOR z=c TO LEN d$: IF d$(z)
>="B" AND d$(z)<="[" THEN  LET d
$(z)=CHR$ (CODE d$(z)+32): NEXT
z
9014 FOR z=c TO LEN d$
9020 IF d$(z)=" " THEN  NEXT z:
GO TO 9035
9022 LET m$(c)=d$(z TO )
9024 FOR z=LEN d$ TO z+u STEP -c
9026 IF d$(z)=" " THEN  NEXT z:
GO TO 9035
9028 IF d$(z-c)<>" " THEN  NEXT
z
9030 LET m$(u)=d$(z TO )
9035 IF loc=5300 AND NOT r(35) A
ND m$(c)<>"cmp" AND m$(u)<>"uvo"
 THEN  PRINT "Sbccjut qpvs pvu p
g fwfsz uvoofmboe cfhjo lobxjoh
bu nz cpez- J ibwf op ftdbqf///"
: PAUSE d: GO TO p
9040 IF u(3)=c AND ((m$(c)<>"xfb
" AND m$(u)<>"sjo") OR NOT o(3))
 THEN  GO TO 8120
9045 IF r(1) AND (m$(c)<>"ljm" A
ND m$(c)<>"iju" AND m$(c)<>"buu"
) THEN  PRINT  INK u;"J nvtu gjh
iu/": GO TO j
9046 IF m$(c)="o  " THEN  GO TO
b
9047 IF m$(c)="t  " THEN  GO TO
b+10
9048 IF m$(c)="f  " THEN  GO TO
b+20
9049 IF m$(c)="x  " THEN  GO TO
b+30
9050 IF m$(c)="v  " THEN  GO TO
b-o-c
9051 IF m$(c)="e  " THEN  GO TO
b-30
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9052 IF m$(c)="mpp" OR m$(c)="m
" THEN  GO TO k
9053 IF m$(c)="tdp" THEN  PRINT
"TDPSF; ";sc: GO TO j
9055 FOR z=c TO 40
9057 IF m$(c)=v$(z) THEN  GO TO
9063
9059 NEXT z
9061 GO TO 9075
9063 IF v(z)=9900 OR v(z)<8e3 OR
 v(z)>9919 THEN  GO TO v(z)
9065 RESTORE i
9067 FOR y=c TO 27: READ w$,x$
9069 IF m$(u)=x$( TO 3) AND NOT
o(y) THEN  GO TO t-o+c
9071 NEXT y
9073 GO TO v(z)
9075 IF m$(c)<>"rvj" THEN  GO TO
 9083
9077 INPUT "Ep zpv xbou up tbwf@
)z ps o*";z$
9079 IF z$="z" OR z$="Z" THEN  G
O TO 9085
9081 RUN 3
9083 IF m$(c)<>"tbw" THEN  GO TO
 9087
9085 PRINT '"4 Bssbzt///":  GO T
O 9994
9087 IF m$(c)="mpb" THEN  LOAD "
v2" DATA o(): LOAD "v3" DATA a()
: LOAD "v4" DATA r(): GO SUB 999
6: CLS : GO TO loc
9095 BEEP .05,25: PRINT "J dboop
u ep uibu zfu/"
9097 GO TO j
9099 REM VERB SUBROUTINES
9100 IF m$(u)="sjo" THEN  GO TO
9120
9102 IF m$(u)="dmp" THEN  GO TO
9115
9103 IF m$(u)<>"ibu" THEN  GO TO
 n
9104 IF r(20) THEN  GO TO t-c
9105 LET r(20)=c: GO TO t
9116 IF NOT r(17) THEN  LET r(17
)=c: GO TO t
9118 GO TO t-c
9122 IF NOT u(3) THEN  PRINT "J
qvu po uif sjoh- cvu ju tmjqt pg
g/": GO TO j
9123 PRINT "Uif csbtt sjoh cfhjo
t up hmpx  boe ju uvsot xijuf/
Uif EbslMpsetipvut jo qbjo boe g
bmmt up uif hspvoe- uif csjhiuof
tt sfqfmt  ijn/"
9125 LET r(19)=r(19)+c
9128 IF r(19)=o-c THEN  LET ca=c
a-c: LET u(3)=u: PRINT "Ijt xipm
f cpez dsvncmft joup"'"xijuf bti
ft/ Uif Ebsl Mpse jt  efgfbufe!
"'"Uif sjoh ejtjoufhsbuft/ B hpm
e  lfz sftut po uif btift/": LET
 a(19)=loc: LET o(o-c)=d: LET a(
o-c)=d: LET sc=sc+50: GO TO j
9130 LET u(3)=d: PRINT "If sfusf
but< cvu if xjmm sfuvso/": GO TO
 j
 9135 IF m$(u)="qbs" THEN  PRINT
"Uif qbsdifnfou tbzt//": PAUSE 5
0: PRINT '"OPUIJOH!!": GO TO j
9140 IF m$(u)="opu" AND loc=3450
 THEN  PRINT "Bo bsspx qpjout bd
sptt uif tboetboe uif pomz xsjuj
oh dmfbs jt"''"  P U  ": GO TO j
9145 GO TO n
9149 REM see text
9150 IF loc=3460 AND o(16) AND o
(17) AND o(18) AND o(19) AND o(2
0) THEN  CLS : PRINT "Uif Lffqfs
 ublft uif lfzt boe  vocpmut ui
f Hsfbu Epps pg Ujnf//  +Hppeczf
+if tbzt/": PRINT  INVERSE c;''
"  QSFTT BOZ LFZ UP SFUVSO IPNF
 ": PAUSE c: PAUSE p: GO TO 200
9152 IF loc<>1170 OR r(13)<>loc
THEN  GO TO n
9153 IF m$(u)="npo" THEN  GO TO
9180
9154 IF m$(u)<>"ovh" THEN  GO TO
 t+o+c
9177 PRINT "Uif tbjmps svct uif
ovhhfu boe  uif zfmmpx dpnft pgg
up sfwfbm btupof! If tveefomz c
fdpnft wfsz bohsz boe tipput bu
nf xjui b  cmvoefscvtt///": PAU
SE d: GO TO p
9180 LET r(14)=c: LET ca=ca-c: P
RINT "J fydibohf nz npofz gps ij
t cpbu": LET a(22)=d: LET o(22)=
d: GO TO j
9186 IF loc=5400 AND m$(u)="bss"
 THEN  LET loc=5415: GO TO t
9190 GO TO n
9305 IF m$(u)="tbo" THEN  LET o(
9)=d: LET a(9)=d: GO TO 9310
9306 IF m$(u)="dij" THEN  LET o(
21)=d: LET a(21)=d: GO TO 9310
9308 PRINT "J dboopu fbu ju boe
ebnbhf nz"'"uffui!": LET st=st-u
: GO TO j
9310 LET ca=ca-c: PRINT "Nvodi//
nvodi//"'"Uibu xbt ojdf!": LET s
t=st+o: GO TO j
9350 IF m$(u)<>"xbu" THEN  GO TO
 n
9355 IF loc=4550 THEN  PRINT "J
dboopu sfbdi uif xfmm xbufs!": G
O TO j
9360 IF loc=5900 AND r(5) AND r(
22)<o-c THEN  LET r(22)=r(22)+c:
 LET st=st+o-c: GO TO t
9365 IF loc=5175 AND st<40 THEN
 PRINT "J esjol/ Nz xpvoet ifbm/
": LET st=st+15: GO TO j
9366 IF loc=5175 THEN  GO TO t
9370 GO TO t-u
9400 IF NOT str THEN  PRINT "Ljm
m XIBU- tuvqje@": GO TO j
9405 LET str=INT str: RESTORE 94
08
9408 DATA "csvjtfe",22,"cmffejoh
",18,"cbemz xpvoefe",14,"tfsjpvt
mz xpvoefe",10,"dsjujdbmmz xpvoe
fe",a,"efbe",3
9410 LET z=INT (RND*u)
9412 IF z AND st-11>str THEN  LE
T c$="If jt ": GO TO 9416
9413 IF NOT z AND st<str+(RND*20
+14) THEN  LET c$="J bn ": GO TO
 9416
9414 PRINT "If sfusfbut/": GO TO
 9445
9416 RESTORE 9408: FOR z=c TO a:
 READ w$,y
9418 IF LEN c$=a AND str>=y THEN
 LET str=str-u: GO TO 9425
9420 IF LEN c$=a-c AND st>=y THE
N  LET st=st-u: GO TO 9425
9422 NEXT z
9425 PRINT c$;w$;"/"
9426 IF st<=3 THEN  PAUSE d: GO
TO p
9428 IF str<=3 THEN  GO TO 9440
9430 PRINT "Tusfohui; ";INT st:
GO TO j
9440 LET sc=sc+o-c
9445 LET r(c)=d: LET str=d
9447 FOR z=c TO a-c: IF u(z)=c T
HEN  LET u(z)=u: LET sc=sc+a: NE
XT z
9450 GO TO j
9470 IF m$(u)<>"gmp" THEN  GO TO
 9475
9471 IF loc<>3170 THEN  GO TO n
9472 IF a(19) THEN  PRINT "Uif g
mpps jt bmsfbez csplfo!": GO TO
j
9473 PRINT "J tujif uif gmpps/ U
if spuufo  xppe tnbtift jotubou
mz/": GO TO j
9475 IF loc=3140 AND m$(u)="cbs"
 THEN  PRINT "Xjof gmpxt pvu boe
 J gbmm cbdl/ Fwfszuijoh hpft cm
bdl///": PAUSE d: GO TO p
9478 IF m$(u)<>"usb" AND loc<>33
70 THEN  GO TO 9490
9480 IF r(3) THEN  PRINT "Uif us
bqepps JT csplfo!": GO TO j
9485 PRINT "J tusjlf uif usbq ep
ps/": LET r(9)=r(9)+c
9486 IF r(9)=r(10) THEN  PRINT "
Ju jt csplfo/": LET r(3)=c
9487 GO TO j
9490 IF loc<>2500 THEN  GO TO t-
u
9491 IF NOT o(5) AND NOT o(12) A
ND NOT o(13) THEN  GO TO t+o+c
9492 PRINT "J tnbti uif jdf/": I
F o(5) THEN  PRINT "Uif dvumbtt
cmbef tobqt dmfbo   pgg!": LET a
(5)=d: LET o(5)=d: LET ca=ca-c
9494 IF NOT a(17) THEN  LET a(17
)=loc: LET sc=sc+15: GO TO g
9496 GO TO j
9500 IF loc<>5300 OR r(35) THEN
 GO TO n
9502 IF NOT o(27) THEN  PRINT "J
 ibwf opuijoh up ep ju xjui!!":
LET m$(c)="    ": GO TO 9035
9505 PRINT "Uif tpjm gjmmt uif i
pmft ojdfmz nvdi up uif sbccjut(
 gsvtusbujpo!!": LET o(27)=d: LE
T a(27)=d: LET r(35)=c: GO TO j
9510 IF loc=5400 AND m$(u)="usf"
 THEN  PRINT "Uifsf bsf bsspxt p
o uif usfft   boe pof ibt34
cvsou joup uifxppe cfmpx ju/": G
O TO j
9511 IF loc=3440 AND NOT a(14) A
ND m$(u)="njt" THEN  PRINT "J db
o wbhvfmz tff b tbx po uif  cbol
/": LET a(14)=loc: GO TO g
9512 IF loc=4300 AND NOT a(a) AN
D m$(u)="csj" THEN  LET a(a)=loc
: GO TO g
9515 IF m$(u)="xbu" AND r(6) AND
 loc=1540 THEN  PRINT "Uif xbufs
 mpplt jdz dpme!": GO TO j
9516 IF m$(u)="qbs" THEN  PRINT
"Po uif cbdl pg uif qbsdinfou ju
 tbzt"'"MPPL.SBJTF UIF QPSUDVMMJ
T!": GO TO j
9517 IF NOT a(18) AND loc=4850 A
ND m$(u)="tff" THEN  LET sc=sc+1
5: LET a(18)=loc: GO TO g
9520 IF m$(u)="nbs" AND (loc=490
0 OR loc=5825) THEN  PRINT "Cmvf
 hbt jt sjtjoh gspn uif"'"sffet/
": GO TO j
9521 REM see text
9522 IF m$(u)="sjo" THEN  PRINT
"Fotdsjcfe po uif tjef jt"; INVE
RSE 1;"+Xfbs boe us5jvnqi!+"; IN
VERSE 0: GO TO j
9525 IF m$(u)="xfm" AND (loc=455
0 OR loc=4560) THEN  PRINT "J db
o tff b ipmf gps b iboemf/": GO
TO j
9527 IF NOT a(16) AND loc=1490 A
ND m$(u)="dbt" THEN  LET sc=sc+1
5: LET a(16)=loc: GO TO g
9529 REM see text
9530 IF loc=5175 AND (m$(u)="tjm
" OR m$(u)="qpp") THEN  PRINT "B
o jotdsjqujpo po uif tjmwfs"'"sf
bet///"'"+UIF LJOH(T IFBMJOH QPP
M+": GO TO j
9532 IF loc<>1080 THEN  GO TO 95
35
9533 PRINT "Uif epps offet b ejh
ju"'"dpncjobujpo!": INPUT "Op/?"
;z: IF z<>r(34) THEN  GO TO j
9534 PRINT "Uif epps txjoht pqfo
!": LET we=1110: GO TO j
9535 IF loc=2260 AND m$(u)="dpg"
 AND NOT a(o-c) THEN  LET a(o-c)
=loc: PRINT "Uif dpggjo jt wfsz
dpme! Po uif mje uif jdf ibt cff
o dijqqfe"'"bxbz boe +TLBSP+ fot
dsjcfe/": GO TO g: REM see text
9537 IF loc=3370 OR (loc=3350 AN
D r(3)) AND m$(u)="usb" THEN  PR
INT "Uif ovncfs ";r(34);" jt tdp
sdife poup ju/": GO TO j
9540 IF m$(u)="qbt" AND loc=3170
 THEN  PRINT "Uif gmpps qbbolt b
sf spuujoh boexfu/": GO TO j
9542 IF m$(u)="dsb" AND loc=5150
 THEN  PRINT "J tff b efbe usff
cz uif ipmf/": GO TO j
9545 IF loc=5415 AND m$(u)="ipm"
 AND NOT a(15) THEN  LET a(15)=l
oc: GO TO g
9548 PRINT "Uifsf jt opuijoh jou
fsftujoh/": GO TO j
9550 IF m$(u)="dfm" AND loc=3290
```

SPECTRUM PROGRAMMING

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 THEN  PRINT "J ibwfo(u hpu uif
lfz!": GO TO j
9552 IF m$(u)="usb" AND (loc=337
0 OR loc=3350) THEN  PRINT "Ju j
t objmfe epxo!": GO TO j
9553 IF m$(u)<>"epp" AND m$(u)<>
"lfz" THEN  GO TO n
9554 IF loc=1080 THEN  PRINT "Ui
fsf jto(u b mpdl!": GO TO j
9555 IF loc<>2230 AND loc<>1930
THEN  GO TO t-u
9560 IF m$(c)="pqf" THEN  GO TO
9575
9561 IF NOT o(c) THEN  PRINT "J
epo(u ibwf uif lfz/": GO TO j
9563 IF loc=2230 AND NOT r(7) T
EN  LET r(7)=c: GO TO t
9564 IF loc=1930 AND NOT r(8) TH
EN  LET r(8)=c: GO TO t
9568 PRINT "Uif epps JT vompdlfe
!!": GO TO j
9576 IF loc=2230 AND NOT r(7) OR
 loc=1930 AND NOT r(8) THEN  PRI
NT "Uif epps jt mpdlfe!": GO TO
j
9580 IF loc<>2230 AND loc<>1930
THEN  PRINT "Pqfo XIBU@!": GO TO
 j
9583 IF loc=2230 AND r(7)=c THEN
  LET r(7)=u: GO TO t
9584 IF loc=1930 AND r(8)=c THEN
  LET r(8)=u: GO TO t
9588 PRINT "Uif epps JT pqfo!!":
 GO TO j
9590 IF loc<>3385 AND (m$(u)<>"t
fb" OR m$(u)<>"wfm") THEN  GO TO
 n
9592 IF NOT a(23) THEN  PRINT "J
 ufbs b qbsu pg uif tfbu/"'"Voef
sofbui uifsf jt b gmjou!/": LET
nt=nt+c: LET a(23)=loc: GO TO j
9593 GO TO n
9600 IF loc=3385 THEN  PRINT "EP
O(U SVTI PGG TP GBTU!": GO TO j
9605 IF loc=3290 OR loc=2990 THE
N  PRINT "DPMMFDUFST( JUFNT/": G
O TO j
9609 REM see text
9610 IF loc=3170 THEN  PRINT "+C
SFBL PVU+ RVJDL!!": GO TO j
9620 IF loc=2230 OR loc=1930 THE
N  PRINT "B QFBS OPU GPS FBUJOH/
": GO TO j
9622 IF loc=5415 THEN  PRINT "GP
MMPX NF!!": GO TO j
9626 IF loc=1170 THEN  PRINT "B
HJSM(T CFTU GSJFOE@/": GO TO j
9630 PRINT "OFYU UJNF///QFSIBQT!
": GO TO j
9635 LET st=st+(st<40)/2: PRINT
"J ";d$;'"Ujnf qbttft///": IF st
r THEN  LET z=INT (RND*5)+9636:
GO TO z
9637 GO TO h
9638 PRINT "Uif";a$(u TO );'"buu
bdlt nf xijmf J sftu/": LET r(1)
=c: GO TO j
9641 PRINT "Uif";a$(u TO );'"mfb
wft/": LET str=d: GO TO j
9655 IF loc<>4550 OR m$(u)<>"ibo
" THEN  GO TO n
9660 PRINT "J uvso uif iboemf bo
e uif cvdlfusjtfft vq uif xfmm/":
 PAUSE 75: PRINT "Ju sfbdift uif
 upq/": PAUSE 30
9662 PRINT "Ju jt gvmm pg xbufs/
": IF NOT a(20) THEN  LET sc=sc+
15: LET a(20)=loc: GO TO g
9664 GO TO j
9670 IF NOT o(12) THEN  GO TO t+
o+c
9680 IF loc=3170 AND a(19) THEN
 PRINT "J ejh cvu pomz tff xpsnt
!": GO TO j
9690 IF loc=1540 AND NOT r(5) AN
D m$(c+c)="uvo" THEN  LET r(5)=c
: PRINT "Voefs uif uvoofm J tff
b ebsl   npvoubjo sjwfs/": GO TO
 j
9691 GO TO n
9695 IF loc=1245 AND r(u) AND m$
(u)="spq" THEN  LET ca=ca+c: LET
 r(u)=d: LET o(u)=c: GO TO t
9697 IF loc=3290 AND NOT a(14) T
HEN  PRINT "Uif cbst bsf ibmg dv
u boe xfbl- uifz cfoe fbtjmz/ J(
n pvu!": LET loc=3350: GO TO loc

9699 GO TO n
9700 IF loc=1540 AND r(5) AND m$
(u)="sjw" THEN  LET loc=5900: PA
PER a+c: INK c: BORDER o+c: GO T
O 9795
9703 IF loc=5175 THEN  GO TO 989
0
9705 GO TO n
9740 IF loc<>3380 AND (m$(u)<>"n
bs" OR m$(u)<>"ips") THEN  GO TO
 n
9745 PRINT "J npvou uif ipstf xi
jdi cpmut"'"boe uispxt nf pgg/ J
 dsbti up   uif hspvoe///": PAUS
E d: GO TO p
9750 IF loc=5175 THEN  GO TO 989
0
9751 IF m$(u)="dbs" AND loc=3380
 THEN  LET loc=3385: GO TO k
9755 IF m$(u)<>"cpb" THEN  GO TO
 9764
9760 IF r(13)<>loc OR NOT r(14)
THEN  GO TO n
9762 LET str=d: GO TO 7300
9764 IF m$(u)<>"spp" AND m$(u)<>
"ouf" THEN  GO TO n
9770 LET str=d
9771 IF loc=2230 AND r(7)=u THEN
  LET loc=2260: GO TO 9790
9772 IF loc=1930 AND r(8)=u THEN
  LET loc=2500: GO TO 9790
9775 GO TO n
9790 PRINT "J hp uispvhi uif epp
s/"
9795 PAUSE 75: GO TO k
9800 IF m$(u)="cpb" THEN  GO TO
9755
9805 GO TO n
9810 IF m$(u)<>"gmj" THEN  GO TO
 n
9813 IF r(11)=o THEN  PRINT "Uif
 gmjou ejtjoufhsbuft/": LET ca=c
a-c: LET a(23)=d: LET o(23)=d: G
O TO j
9815 PRINT "J tusjlf uif gmjou-t
qbslt bqqfbs": LET r(11)=r(11)+c
9820 IF loc<>4900 AND loc<>5825
THEN  LET r(18)=c: GO TO j
9825 FOR z=o+c TO -20 STEP -c: P
APER u: CLS : PAPER a: CLS : BEE
P .005,z: NEXT z
9827 PRINT "Uifsf jt b nbttjwf f
yqmptjpo///": PAUSE d: GO TO p
9830 IF loc=3290 AND (m$(u)="spq
" OR m$(u)="cbs") THEN  PRINT "J
 uispx uif spqf uispvhi uif"'"cb
st/ Ju dbudift uif ippl cvu   tm
jqt pgg/": GO TO j
9850 IF m$(u)<>"cbs" THEN  GO TO
 n
9852 IF loc<>3290 THEN  GO TO t-
u
9853 IF NOT o(14) THEN  GO TO t+
o+c
9855 PRINT "J tbx uif cbst/"
9857 PRINT "[([( [([( [([(///"
9860 LET z=INT (RND*u)+9861: GO
TO z
9861 PRINT "J(n pvu tbgmfz/": PA
USE r: LET loc=3350: GO TO loc
9862 PRINT "Uif kbjmfs foufst/"'
"+Pz!! Xibu e(zf uijol z(epjo@!+
 If tipvut/": REM see text
9863 PRINT "If svot vq up uif df
mm boe      tobudift uif tbx/":
LET o(14)=d: LET ca=ca-c: LET a(
14)=loc: GO TO j
9865 IF loc<>3385 OR m$(u)<>"dbs
" THEN  GO TO n
9866 LET loc=3380: GO TO k
9890 IF loc=4300 THEN  LET loc=1
600: GO TO k
9891 IF loc=1600 THEN  LET loc=4
300: GO TO k
9893 IF m$(u)<>"qpp" THEN  GO TO
 n
9895 IF NOT a(a+u) AND NOT a(26)
 THEN  PRINT "B mbnq gmpbut up u
if xbufs"'"tvsgbdf/": LET a(a+u)
=loc: GO TO g
9897 GO TO t
9900 IF m$(u)<>"mbn" THEN  GO TO
 n
9901 IF o(26) THEN  PRINT "Ju JT
 mju!": GO TO j
9902 IF NOT o(a+u) THEN  GO TO t
-o+c
9903 IF NOT r(18) THEN  GO TO t+
o+c
9904 IF loc=5400 THEN  PRINT "PL
///Cvu ju cmpxt pvu!": GO TO j
9905 PRINT "P/L/": LET o(8)=d: L
ET o(26)=c: LET a(8)=d: LET a(26
)=loc: LET r(18)=d: GO TO j
9920 IF m$(u)="usf" AND o(u) AND
 loc=5150 AND NOT r(u) THEN  LET
 nt=nt+c: LET do=1245: LET r(u)=
c: LET ca=ca-c: LET o(u)=d: LET
a(u)=loc: GO TO t
9922 GO TO n
9952 IF loc=5150 AND r(u) THEN
LET nt=nt-c: LET r(u)=d: LET do=
d: LET ca=ca+c: LET o(u)=c: GO T
O t
9953 GO TO n
9960 REM COMMON RESPONSES
9962 BEEP .1,10: PRINT "J epo(u
ibwf UIBU/": GO TO j
9963 BEEP .1,d: PRINT "UIBU jt o
pu ifsf!": GO TO j
9964 PRINT "J BN xfbsjoh uibu!":
 GO TO j
9965 BEEP .05,RND*20-20: PRINT "
P/L/"
9966 IF NOT o(a) THEN  LET r(17)
=d
9967 IF NOT o(a*o) THEN  LET r(2
0)=d
9968 IF r(18) THEN  LET r(18)=d
9969 GO TO j
9970 BEEP .1,-a: PRINT "Xjui XIB
U@": GO TO j
9979 REM END ROUTINE
9980 RESTORE 9982: PAPER d: INK
a+c: BORDER d: CLS : LET e$="U I
 F  F O E"
9981 FOR z=c TO 12: READ x,l: PR
INT AT 10,z+9;e$(z): BEEP x,l: N
EXT z
9982 DATA c,-12,c,-12,.25,-12,c,
-12,.75,-9,.5,-10,.5,-10,.75,-12
,.75,-12,.75,-13,.75,-12,.75,-12
9984 DIM t$(u,36)
9985 LET t$(c)="ZPV IBWF GBJMFE
JO ZPVS RVFTU"
9986 LET t$(u)="EP ZPV XJTI UP U
SZ BHBJO    z PS o"
9988 FOR z=c TO 32: BORDER o+c:
POKE 23692,o: PRINT TAB 15; INK
o+c;t$(c,z): BEEP .005,40: BORDE
R c+c: NEXT z
9990 FOR z=c TO 36: BORDER o: PO
KE 23692,a+c: PRINT TAB 15; INK
o+c;t$(u,z): BEEP .005,9: BORDER
 u: PAUSE c: NEXT z
9991 PAUSE d
9992 IF INKEY$="z" OR INKEY$="Z"
 THEN  RUN 3
9993 CLS : PRINT AT 21,0;"QSFTT
BOZ LFZ UP SFTFU DPNQVUFS/": PAU
SE c: PAUSE d: NEW
9994 LET r(23)=loc: LET r(24)=st
: LET r(25)=str: LET r(16)=nt: L
ET r(a)=sc: LET r(o)=ca: LET r(2
7)=no: LET r(28)=ea: LET r(29)=s
o: LET r(30)=we: LET r(31)=up: L
ET r(32)=do
9995 SAVE "v2" DATA o(): POKE 23
736,181: SAVE "v3" DATA a(): POK
E 23736,181: SAVE "v4" DATA r():
 IF m$(c)<>"rvj" THEN  GO TO j
9996 RUN 3
9998 LET loc=r(23): LET st=r(24)
: LET str=r(25): LET nt=r(16): L
ET sc=r(a): LET ca=r(o): LET no=
r(27): LET ea=r(28): LET so=r(29
): LET we=r(30): LET up=r(31): L
ET do=r(32): RETURN
```

MINDPLAY

Peter Sweasey brings you another missive from the grim depths of the dungeon



Adventuring does stretch the mind.

A small ray of sunshine streams through the dungeon grating. Can it really be June already? Not that it means anything to me; these dingy depths are as damp as ever. All the Argus Press sewer pipes lead down here, and barbaric Bryan, my savage editor, chucks cold, lumpy custard through a crack in the ceiling whenever I'm late for a deadline. It makes a terrible mess of my ancient VDU screen and it encourages the rats, which are fatter than ever and almost as repulsively nasty as Bryan is. . .

Not only do I have to face those problems, but there still isn't much adventure software coming through. Where is it all? Oceans's Hunchback Adventure still hasn't arrived. "Released early January" you may remember the adverts stated — and they even put 1986 after it, so they can't claim they meant next year. The nice lady from Ocean tells me it will be out in "a few weeks" (funny, she said that last month). So it should be out by the time you read this. Review next issue perhaps?

Also in time for review next month, PSS might have released their second level Swords and Sorcery package — but then the first one was a year late, and this one is already a few weeks overdue. As I said last issue, Ariolasoft are scheduling Three Days In Carpathia for release on 5th May, so I should be able to squeeze that in for review next time too. But even that game was first promised many months ago. What is it about adventures that makes software companies go haywire? Is it just to spite me — perhaps they're in league with Bryan?

One product I am really looking forward to is Incentive's Graphic Adventure Creator, a Quill style product which received rave reviews when it appeared on the Amstrad late last year (mind you, I suppose the Spectrum is an Amstrad now — very confusing). That should also arrive for review during the next month or so. Plenty to look forward to then, but will any of it ever arrive? Or, in the case of Hunchback, does it even exist?. . .

Disappointing Budget. . .

Ah yes, you can rely on Mindplay for razor-sharp political comment on Nigel Lawson's every policy. Well actually that's a bit of a fib, because the headline above is supposed to introduce a little pondering on budget software.

This leads on from the fact that the two games I do have to review this month are budget games, from cheapo company Atlantis. These are both rather average and I must say that I have yet to see many really good low price adventures. A few come close — notably those from 8th Day. But why aren't we seeing excellent adventures from Mastertronic or Firebird, who have both proved that good arcade games can be produced cheaply.

Budget software is the ideal format for adventures. They don't have to cost much to develop when you can use the Quill or a similar utility. Adventures have a limited lifespan, once they have been solved, they can be thrown away. Their disposability should be reflected in the price.

To be fair to the budget companies, many have tried to release some adventures. But these have failed due either to unoriginality (the familiar flaw of British adventures at all prices) or lack of polish. Both of these can be put down to a lack of a selling feature; there's nothing special to attract the buyer's, or reviewer's, attention.

The situation can be remedied in two ways. Firstly by thinking up more original ideas. There are numerous sources for inspiration which haven't been touched on yet, for instance out of copyright books. Creative Sparks proved with Macbeth that Shakespeare can make good adventures. Or how about Dickens? I could go on but I'm keeping some ideas to myself. . .

The other way is increased professionalism. This is gained by thorough testing (which I ranted on about last month), and other small touches, like redefining the character set or split screen graphics (both perfectly possible with the Quill suite of utilities).

I hope that the budget companies will realise the scope for decent cut price adventures eventually. There's a very large market for them waiting to be tapped.

RETURN TO ITHACA



Atlantis
£1.99

You play the part of Odysseus in this graphic adventure, and must re-enact his epic voyage from the fallen city of Troy to his girlfriend Penelope in Ithaca. A journey which lasted ten years and was fraught with countless perils, according to the extremely brief instructions.

Return To Ithaca is Quilled, with rather average, though not unattractive, graphics from The Illustrator. These are full screen, and annoyingly repeat everytime you enter a location, so you have to wait for them to draw each time.

The game is very difficult. Even I, a supposedly experienced adventurer, became stuck within the first two locations. In the end I had to phone Atlantis and ask for help (it was either that or risk the wrath of Bryan and his whip again). However, rather than to be an entertaining challenge, the difficulty is increased to near impossibility by a very tight vocabulary. At times you are required to use really obscure wording like SET SAIL. The fun of trying various solutions to a problem is diminished because the program is almost totally unresponsive. Except when you enter the right combination, it doesn't play along with your ideas. Thus instead of the computer being a tool for you to control, you end up working for the computer, which isn't the way a good, user-friendly adventure should be.

That said, for a mere two pounds Return To Ithaca will provide a reasonable challenge for the experienced adventurer, if you can tolerate the finicky vocabulary. But if you're a novice: stay clear!



MARIE CELESTE

Atlantis
£1.99

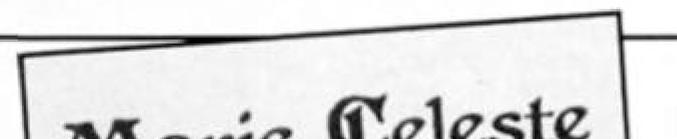
The very brief inlay introductions tell us that this is the Marie Celeste mystery — but set in space. Your task is to collect some treasure from her and fuel for your own craft, and to find out what happened to the vanished crew.

Apart from this latter twist, this adventure turns out to be another of those interminable science fictions spaceship games. You know the sort — wandering round echoing corridors, encountering computer terminals, rough androids, airlocks etc. The game was Quilled, but way back in 1984, so the graphics are made up of UDG's rather than drawn with The Illustrator. As such they tend to be crude, though one or two are surprisingly effective.

The game suffers from a restrictive vocabulary, except for some unusually useful and intelligent HELP responses. Also, there seems to be a major factual flaw in the game: the vessel you are on is supposed to be a space version of the traditional Marie Celeste, yet things are described as "inoperative", and there's no atmosphere of the ship having just been deserted. This could have been the feature that lifted the game to something special; but instead it is wasted.

The experienced adventurer will find this too like so many other games to stomach, but the novice may find it attractive. There is some fun to be had if it's all fresh to you, as this one is quite nicely executed. Deserving of its current budget game status, but definitely nothing special.





HELPLINE

Still no readers' problems. What is my excuse this time? Well the first issue has only been out for one week at the time of writing, and the postal service wasn't operative for half of that week due to various holidays (not for me, I hasten to add).

So all the letters which I'm sure you are writing haven't had a chance to reach me down here yet. No matter, for I shall once again conjure solutions up from the depths of my mind in the hope that they may be of use to some struggling adventurer, somewhere.

Starting with the first part of a comprehensive guide to playing Firebird's excellent *Runestone*, as promised last time. You may want to skip this section as some of the hints are quite generous. The manual doesn't actually make your quest that clear, so

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here it is more explicitly. Morval, Greymarel and Eliador will eventually have to journey to Korodomir's fortress, deep in the heart of his domain at the top left hand corner of Belorn. You must travel the land searching for some objects vital to your goal. You will also find some of the lost treasures of the land, and these are vital if you wish to gain a reputable score.

At the start of the game, six intelligent orcs start hunting characters such as Greymarel, and two of the main three will probably be captured. I would play Morval, let the others be taken, and rescue them later; they'll be in one of the orc's towers (usually Krilbroths) in the Bay. But make sure Greymarel has his staff and Eliador his bow and arrow.

It pays to travel around the southern land at the start. You should collect useful characters like Brunor and Barinir who are good fighters. You can buy some bread from Maladron the merchant — it will restore your strength after fighting. You will need the coin from Lissa to do this. Questor the Hermit is worth a visit: ask him for help. What he describes will only appear if you have spoken to him.

As I said in my review, Skrimnal the sly is a right pain as he steals all your stuff and grins at you. The way to stop this is to tell him to DROP ALL then MOVE in the opposite direction to the one in which you are heading. If he turns up while you are in a fight situation though, you can use him to try to kill a few orcs — and if he gets seriously injured, you feel good anyway!

Greymarel cannot cast magic without proper equipment. He must collect the staff from his tower at the start of the game, and he will need the information contained in the Book of Zarimir, which is on the island with the tower in the middle of The Great Waters. You will need Chrona the Wise to read this; it is best for Eliador to collect her from her hut at the start of the game. Ask her to read it and she will tell you the names of five spells, which Greymarel can then cast providing he has the book. These include Afortis, which increases the strength of the person you cast it at, and Xaramit, which decreases strength. Shazoroth will make a person vanish — they're transported to the island with the tower. I'll tell you about the other two next month, when I'll also tell you more on what you need to collect, and start accounting how to defeat Kordomir.

A few quickie hintettes. In *Mindshadow* (now available on a compilation tape with Shadowfire, Gyron and Fighting Warrior — good value) don't ignore that shell on the beach. Take it on the ship with you, as you will need it in part two. To survive the poisoned arrow attack in the Luxemburg hotel, duck once you go into your room.

In *Classic Adventure* (also available in a very good value double pack with the marvellous Mordon's Quest for the QL) throw an axe to kill a dwarf. A bird in the hand will scare off the snake. Say PLUGH at the rock with Y2 inscribed in it and you will return to the brick building at the start. A wave of a magic wand will solve a cross problem; a later brige will require you to surrender a treasure. But don't worry, it can be retrieved later with a little gargantuan magic.

Write me a letter. . .

What's this? Just as I am drawing this missive to a close, what should pop through the grating but some readers letters? At last! No time to deal with them this month, but looking at them quickly I can predict the helpline will feature The Hobbit, Sherlock and Spiderman next issue. And in the meantime, the readers concerned will receive a personal reply so they are not left languishing helpless for too long.

You too can have your adventuring problems solved — but I stress *adventuring*. I cannot help with gardening, Physics, homework or your marriage. But Scott Adams or Level 9; no trouble. Just fill in the coupon printed her. I offer a personal reply service if you send a stamped, self addressed envelope. However, for the month of June only, you may experience some delay in receiving your reply — I'm tied up with something else (chains to be exact, around my arms and feet and attached to the wall).

Don't forget, I also want to hear from you if you've solved any adventures on your Sinclair. (Or should that be Amstrad? Or Amsinclair? Or Sinstrad?). Sometimes even I need help in solving the occasional game, and there are plenty I haven't played. In particular I'd like to know if you can solve Terrormolinos, The Pawn or Level 9 games, for various reasons.

And I'd love to hear your opinions on what makes a good or bad adventure. Perhaps you could recommend some good budget adventures?

The address to send your coupons, pleas, solutions, escape kits, fan mail, used ten pound notes etc. to is: Mindplay, Horribly Damp Argus Press Dungeon, ZX Computing Monthly, No. 1 Golden Square, London W1R 3AB. Until next time, mes amis. . .

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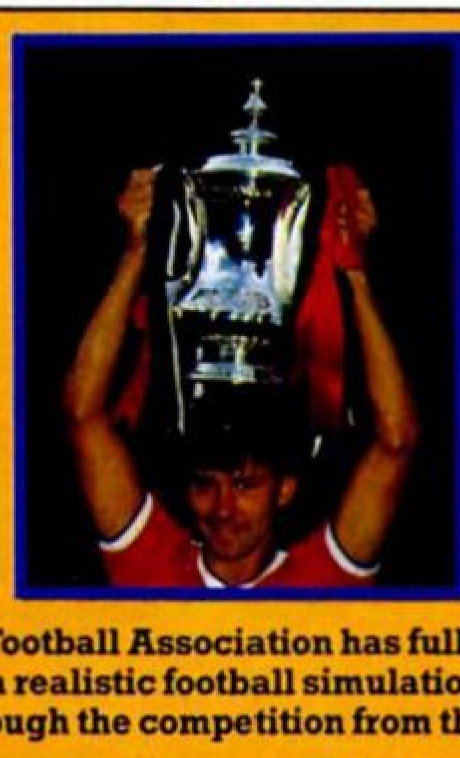
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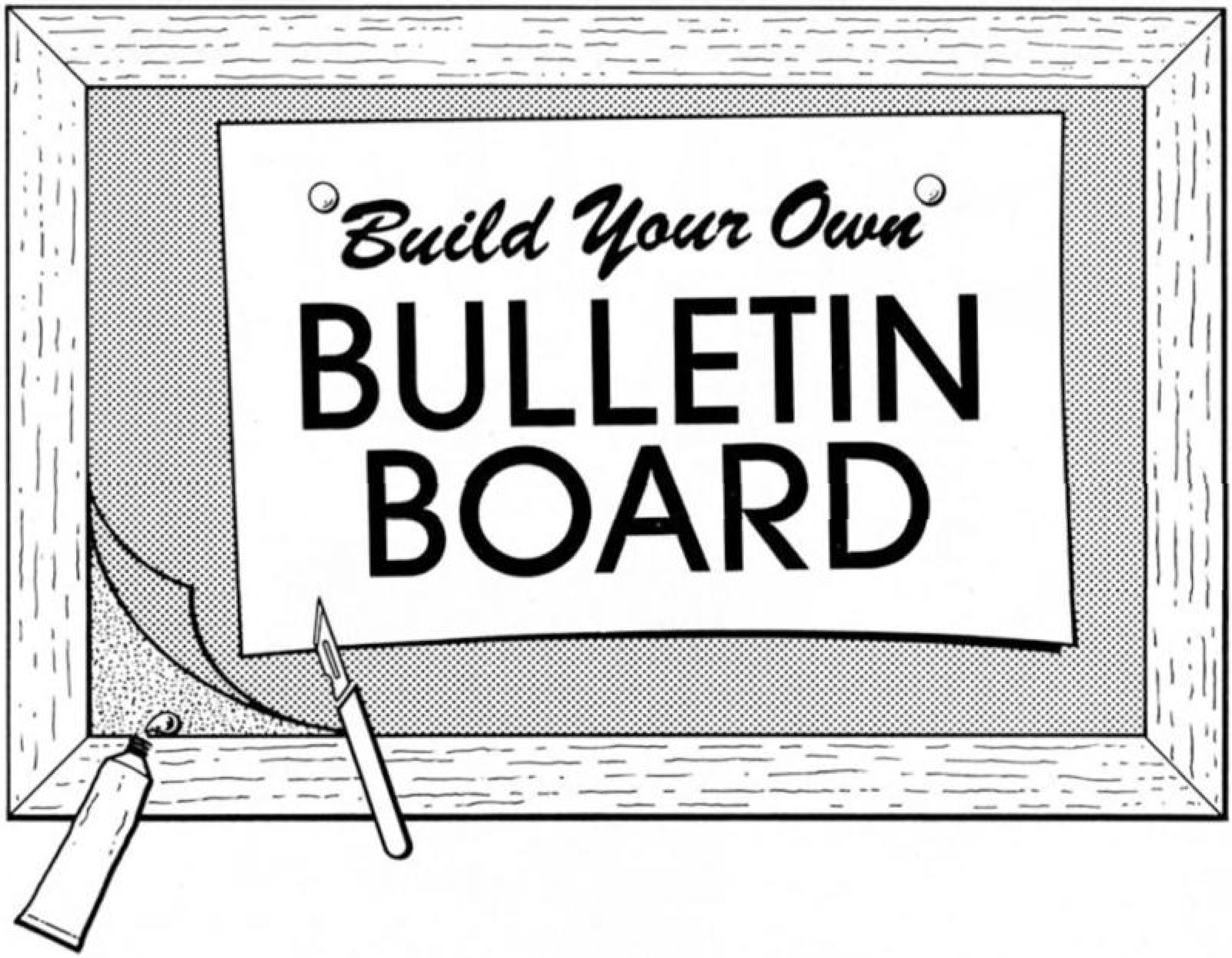
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If logging on to somebody else's board seems too costly, Fred Mullins can show you how to start your own!

One of the reasons for people putting off contacting Bulletin Boards is the cost, usually of the telephone call. So, if you have a club of friends interested in computers, or just in talking to each other about different things, why not try to bring it a little closer by owning your own board?

In the school it might be that the computer and the telephones are not used after hours and this is a waste, plus the fact that a Bulletin board can be used to train people for a job! (many ITEC's actually do that). Your own Bulletin Board would not add to the phone bill as all calls are paid for by the people phoning in!

D.I.Y.

Having a BB doesn't always require a modem and a telephone line. It can still be done from the keyboard with full security such as passwords etc. if you can use a machine code error routine (many magazines have listed them, so I won't go into that here).

INKEY$ can be used to scan the keyboard by a BASIC program and the screen can be used for output. Storage of messages etc. can be in string arrays which makes the necessary software simple to write and you can backup the messages to tape or microdrive at the end of the day.

The Spectrum and QL's editing facilities make it easy for the user to correct any mistakes without complicated editing routines. The only limit is the amount of memory you have available to store the messages after the main program has been written.

Facilities required

Most Bulletin Boards are basically message stores, with the added advantage that the system operator (SYSOP) can also add news and advertisements to pay for the system if he likes. Program transfer comes secondary (especially if you are just operating it from the keyboard, as it is then ipossible). If you want to transfer programs you need to stick to the common type of transfer system, which is XMODEM, as this is used on many boards. This cannot be used on a viewdata system and so special terminal programs have to be used which are not so reliable.

Viewdata systems are cheap on memory and give the added advantage of colour. The memory requirement for each page is 1K so that you can have quite a few pages on a system which has a small memory. The disadvantages are that special programs are required as the Spectrum does not have a viewdata screen and that messages have to be uploaded at 75 baud which is very slow!

Also, most viewdata systems do not allow you to create a colour page on-line as it requires you to send non-printable codes. They have to be

uploaded after being created locally (which requires yet another program!). However a Bulletin Board program for the ZX Spectrum based on viewdata is available from Diamond Designs which only requires a VTX500 and microdrives to work.

A machine code program will be necessary as the modem program will have to be written using it, as BASIC is too slow to cope. It also needs to run and interrupt BASIC so that characters can be stored in a buffer while the BASIC program is calculating. Sinclair users will need an RS232 board to connect a modem (adaptors were listed in last month's article on communications). They need to control the modem a bit more than with a terminal program as they need to detect ringing, modem carrier and be able to sieze/release the telephone line.

The modem speed should allow you to use the least 300 baud as this is the most common Bulletin board speed, and cheap auto-answer modems are available on the second-hand market.

Bulletin Boards that run on ASCII are large programs (the one that I log on to regularly uses a 28K program and a minimum of about 100K of files), so they usually rule out microdrives and make discs essential as space has to be allocated on top of this for messages! The program can, however, be quite small if you reduce the facilities. At the end of this article you will find a book recommended that contains Basic programs which use arrays for everything, so that you can cram it into 48K.

Getting it together

The first requirement is some sort of storage system that is quick and large in capacity as you will have to make frequent backups to stop the board accidentally wiping out all your messages.

The program should be able to answer the line, switch to the correct speed if necessary and send a message announcing its prescence. It should then ask and check the caller's name and password before allowing access to the board. From then on the choice is yours, whether to just display pages under the user's control within the limits you have set or to add other facilities that the user can use.

Obviously there must be some sort of priority system for users as you might have facilities under test or private messages on the board that you don't want everyone to see!

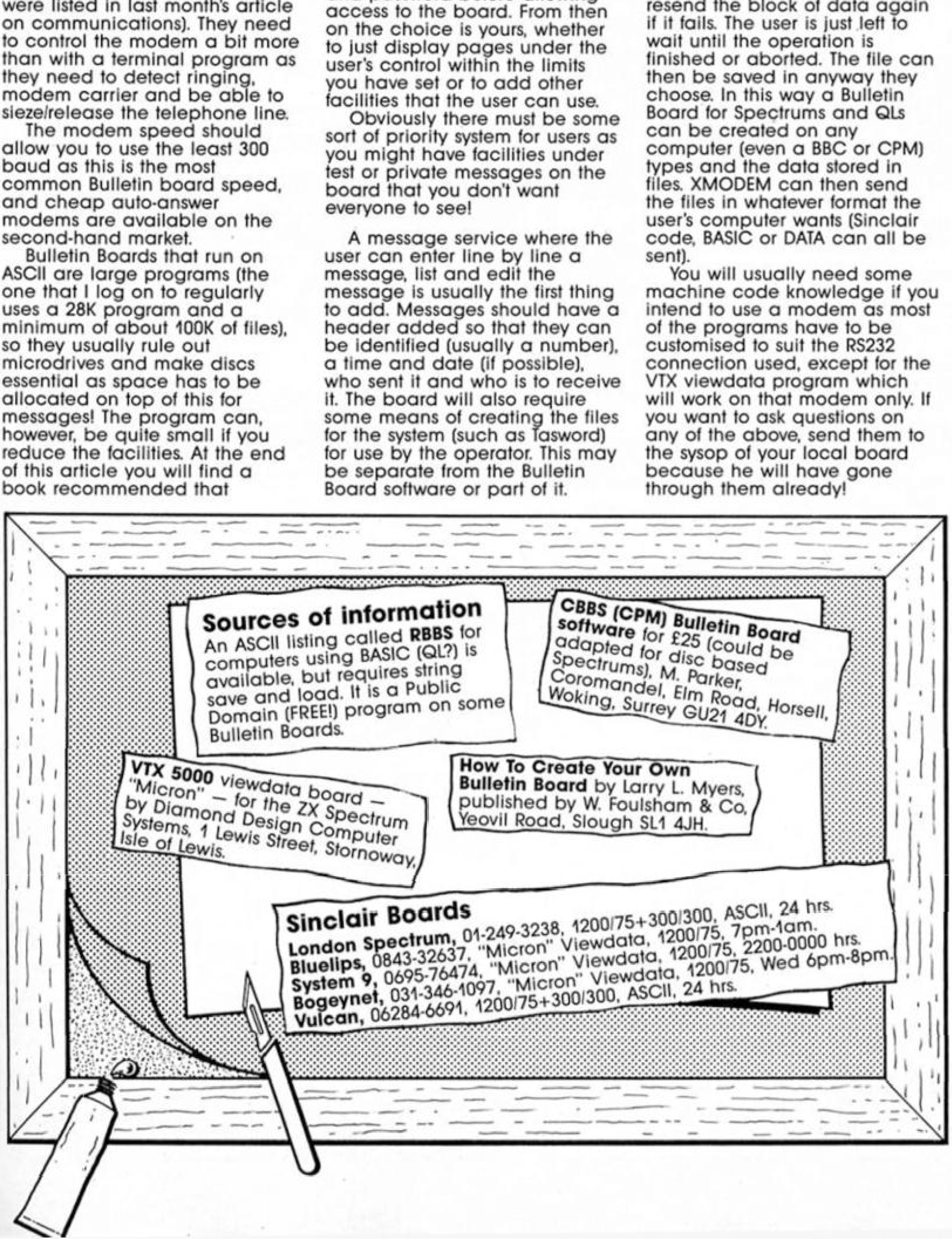
A message service where the user can enter line by line a message, list and edit the message is usually the first thing to add. Messages should have a header added so that they can be identified (usually a number), a time and date (if possible), who sent it and who is to receive it. The board will also require some means of creating the files for the system (such as Tasword) for use by the operator. This may be separate from the Bulletin Board software or part of it.

Transferring files requires some complicated machine code, so either buy this as software or be prepared to do a lot of work. Try to stick to the XMODEM standard (details of which can be found on various BBs) so that users do not have to rewrite their terminal software for every board they use!

XMODEM

XMODEM has the advantage that it can be implemented on any computer as it does not care about the data it's sending. It adds a header and a checksum of its own and will resend the block of data again if it fails. The user is just left to wait until the operation is finished or aborted. The file can then be saved in anyway they choose. In this way a Bulletin Board for Spectrums and QLs can be created on any computer (even a BBC or CPM) types and the data stored in files. XMODEM can then send the files in whatever format the user's computer wants (Sinclair code, BASIC or DATA can all be sent).

You will usually need some machine code knowledge if you intend to use a modem as most of the programs have to be customised to suit the RS232 connection used, except for the VTX viewdata program which will work on that modem only. If you want to ask questions on any of the above, send them to the sysop of your local board because he will have gone through them already!



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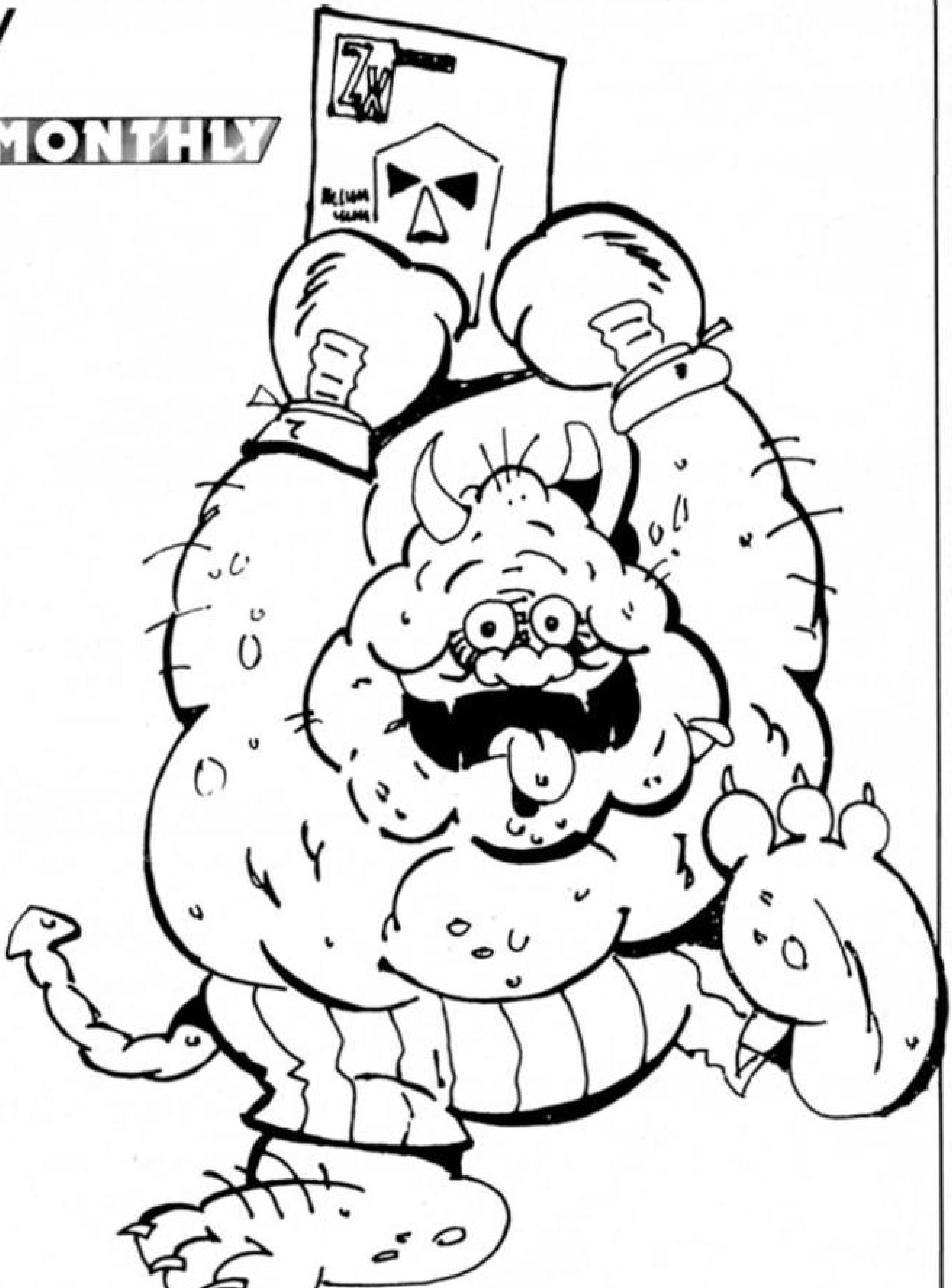
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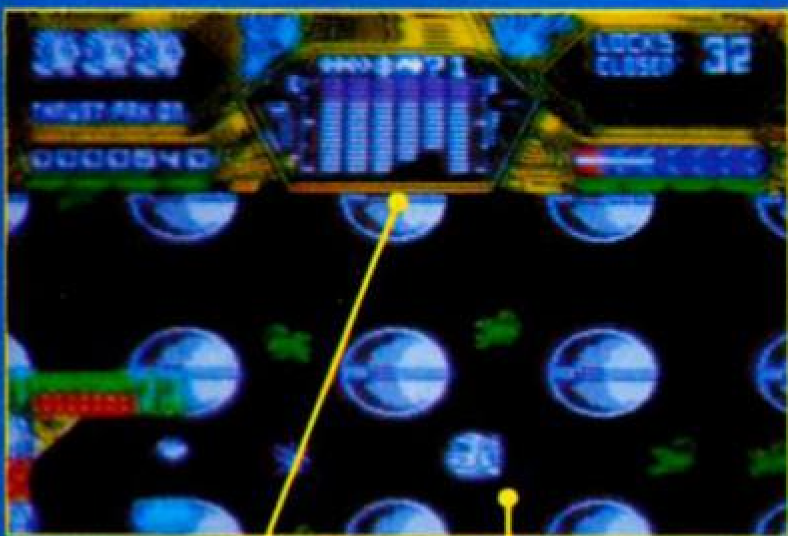
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TANTALUS



These are the energy levels of Spike's weapons. The highlit arrow shows the one currently in use

Spike in his space suit which gives him the ability to fly around the fortress, plus a few of the 48 types of alien that are out to get him.

Spike in the nude — a genetically engineered hedgehog.

These are the roof spikes that create deadly one-way tunnels

If spike falls into this acid bath he'll lose more than just his space suit



Something nasty lurks beneath the surface of Tantalus IV. ZX takes an early look at the action in the forthcoming game from Quicksilva.

Tantalus is both the sequel to Quicksilva's earlier game, Glass, and the first of a projected trilogy of games in which the main character, Spike, confronts a being known only as The Enemy.

Spike is one of a team of genetically engineered beings who have all been created to be warriors, and it is up to him to enter The Enemy's fortress on the planet Tantalus IV and penetrate the central chamber where the enemy waits. The fortress is huge, containing 1024 screens full of traps and deadly aliens, as well as a series of airlocks and lock units which have to be destroyed in order to gain access to the inner sections of the fortress.

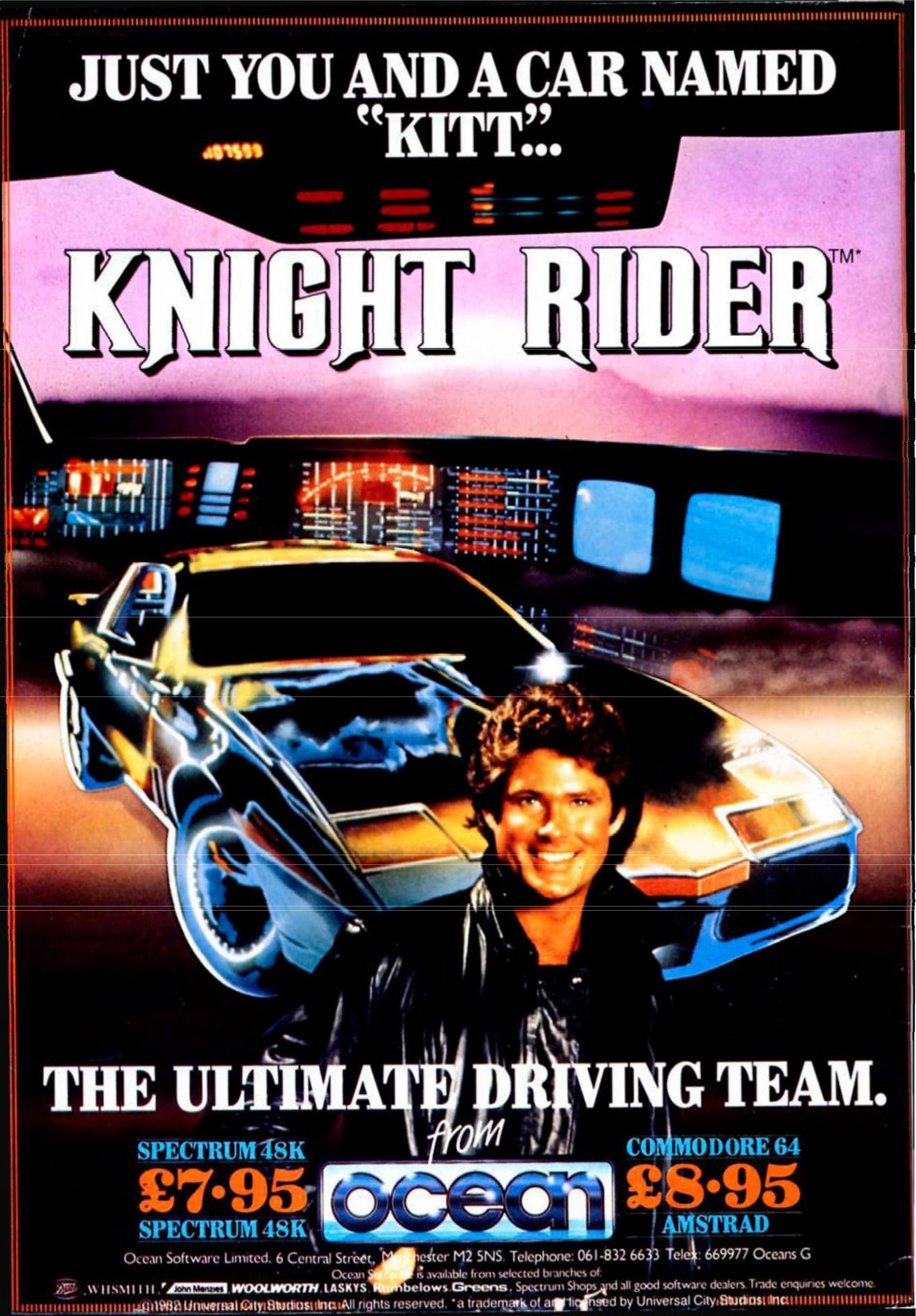
To help him along the way, Spike is armed with five different types of weapon and a space suit. These weapons have different effects and recharge at different rates so you have to use your judgement in deciding when to use a particular weapon. Spike's space suit enables him to move around in any direction he wants, and to fly over any obstacles in his way, but each time he passes through an airlock he has to remove the suit and this limits his movements so that he can only move left/right and jump which means that getting past all the traps becomes that much harder. These traps are a motley assortment of lasers, acid baths, grabbers and electrified doors.

Amongst the nastier of these things are the roof spikes which descend in wave-like patterns which look misleadingly simple to get past. Just as you get halfway through a passage full of these things you can suddenly realise that you've misjudged the pattern of their movement and that you're about to be turned into a kebab. Then there are the dissolving walls which fade away to let you pass, only to reappear when you're halfway through. Fortunately not all of these kill you on the spot — most of them simply drain Spike's energy levels by a certain amount, though of course if you get zapped enough times then you will lose one of Spike's four lives. And, if you should fall into an acid bath then you'll just go up in smoke straight away.

Having lost his space suit by going through an airlock, the only way for Spike to get suited up again is to find another airlock. Then in order to reach the innermost parts of the fortress he has to unlock the 32 doors that stand in his way. But to do this he has to locate the corresponding lock units and destroy them, but there's no way of telling which lock opens which door. All this, and the sheer size of the game (the fortress is laid out in a grid, 32 screens high and 32 wide) looks like making Tantalus a mapper's delight.

Visually the game is excellent. It's very colourful, and considering the limitations of the Spectrum's attribute handling, the author, 17 year old Paul Hargreaves, has managed to produce some very finely detailed screens full of action. Unfortunately Quicksilva aren't giving out any details about the other games in the trilogy just yet, but Tantalus looks like it could get the series off to a good start.


ZX COMPUTING PRESENTS...
by J.STRUDWICK
Hi!
THIS MONTH I THOUGHT I'D DO A REPRESENTATION OF MY FAVOURITE T.V HERO...
SO HERE GOES!
OH WELL! BETTER LUCK NEXT TIME
NEXT MONTH:
HE ATTEMPTS A REAL MASTERPIECE!!



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